the OIL AND GAS JOURNAL

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PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 SEPTEMBER 28, 1953

Features you will like in —

ROCKWELL "201" ORIFICE METERS

LEAKPROOF STUFFING BOX

Has combination bearing and packing made of Teflon. All other parts are of stainless steel. The higher the pressure the tighter the seal, yet Teflon seals without binding and requires no maintenance.

INTERCHANGEABLE HIGH SIDE CHAMBERS

The unit manometer construction permits you to interchange high side chambers easily and adapt any range meter to higher or lower differential requirements. This construction saves stocking spare meters.

ROCKWELL CHART DRIVE

Hermetically sealed. Runs 8 days with one winding. Chart arbor turns once in 24 hours. Turret converters permit chart rotation rate to be changed at will.

STAINLESS PEN ARMS— MICROMETER ADJUSTMENT

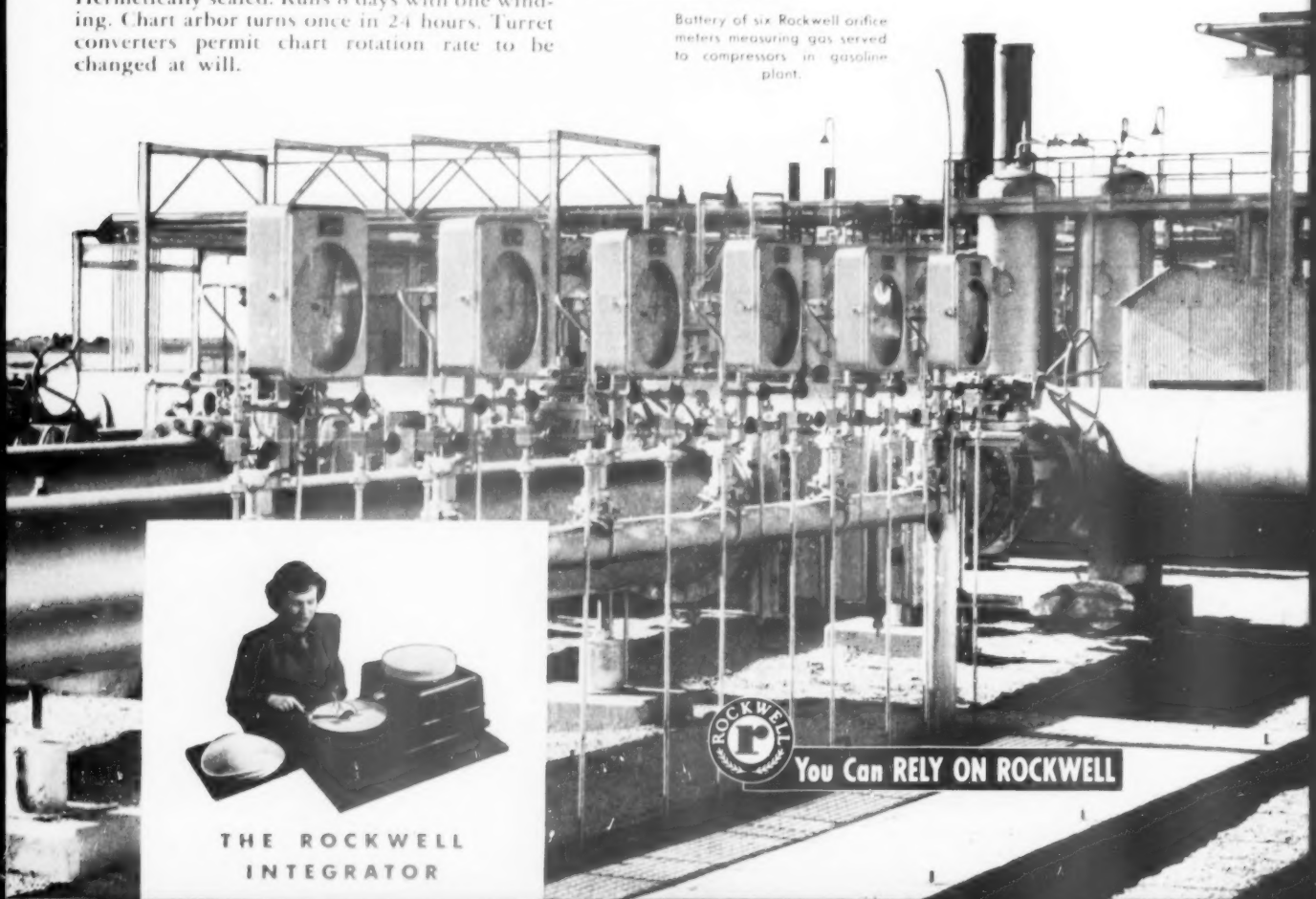
The corrosion resistant pen arms are painted different colors for ready identification. A simple micrometer adjustment is provided for zero setting.

SERVICE CONVENIENCE

Your field men appreciate the extra strong construction—the simplified arrangement of parts—the clean records left by the positive inking pens —the ease with which the meter can be serviced with ordinary tools.

Write for bulletin 1050

Battery of six Rockwell orifice meters measuring gas served to compressors in gasoline plant.



THE ROCKWELL INTEGRATOR

Mechanically calculates up to 300 average charts a day with instrument accurate precision. Produces a verified record of results. Accuracy to within ½ of 1 per cent is practical. Described in bulletin 1016.

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the OIL AND GAS JOURNAL

SEPTEMBER 28, 1953 VOL. 52 NO. 21

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In Brief . . .

1. DENVER REFINERY . . . How existing equipment was incorporated by Bay Petroleum Corp. in its new processing scheme at the Denver refinery is detailed here. Bay's new facilities now include a revamped crude-topping unit, a visbreaker-vacuum unit converted from the former Dubbs thermal cracking operation and a new U.O.P. fluid catalytic cracking unit. The last named is designed for slightly over 3,500 bbl. per day of fresh gas-oil feed at 76 per cent conversion with coke-burning capacity of 3,770 lb. per hour. The cat poly unit was also redesigned to produce 315 bbl. per stream day of 10-lb. polymer.

2. ONE-STEP BUTADIENE . . . The only commercial single-step process for the production of butadiene from n-butane is the Houdry Process Corp. dehydrogenation method. This is a fixed-bed, cyclic adiabatic process with conditions chosen so that heat supplied in regeneration is essentially that required for reaction. The Standard Oil of California unit has a capacity of 18,000 tons of butadiene per year. It was originally employed for butadiene manufacture and later for both butadiene and butene.

3. ROLE OF GRAVITY . . . This is a symposium aimed to answer the question: "How should gravity be used in prospecting for oil." Four separate papers are included. The first tells how high-quality gravity surveys can be useful as a guide to localize leasing and seismic work. The second takes a look at the record that gravity has had in discovering structures favorable to the accumulation of oil. The third discusses the three major limitations of gravity. "The value of regional gravity" and "what's wrong with gravity" are the subjects of the fourth discussion.

4. HYDROCARBON EXTRACTION . . . In Part I of a University of Michigan report on data required and available for deep extraction of ethane and propane, Donald L. Katz and coauthors give a review of data on vapor-liquid equilibria, densities, viscosities, and thermal properties when going into the low-temperature region.

5. MEASURING HYDROGEN . . . A new instrument has been developed by Standard Oil Co. (Indiana) which employs beta rays for speedy accurate determination of percentage of hydrogen in liquid hydrocarbon fractions. This should find widespread use in the petroleum industry for plant and product control as well as for research work.

EARL L. MANNING *has been a Party Chief with Independent for 9½ years. With the Company for 18 years, he has progressed through virtually every job on a field party, and has a total of 24 years of experience in geophysical work.*

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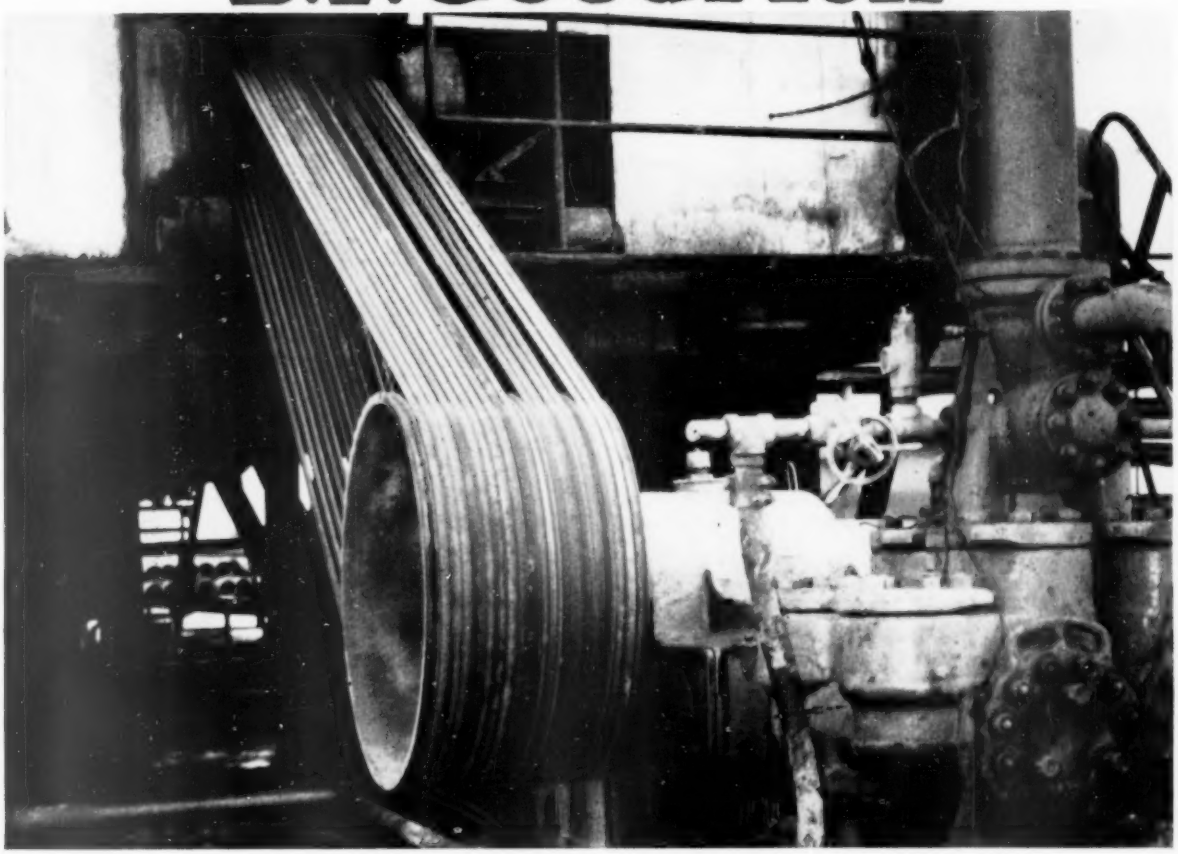

Grommet belts still at work after two years and 20 oil wells

B. F. Goodrich V belts last longer, yet cost no more

THOSE B. F. Goodrich Grommet V belts run the mud pump of a Texas oil drilling rig. While the average set of V belts lasts only 12 months in this type of service, the Grommet belts had been running two years when this picture was taken. And this job was their 20th well, representing a total of 142,000 feet of drilling. In spite of continuous high speed and exposure to all kinds of weather, these Grommet belts were still going strong, and were moved to their 21st well.

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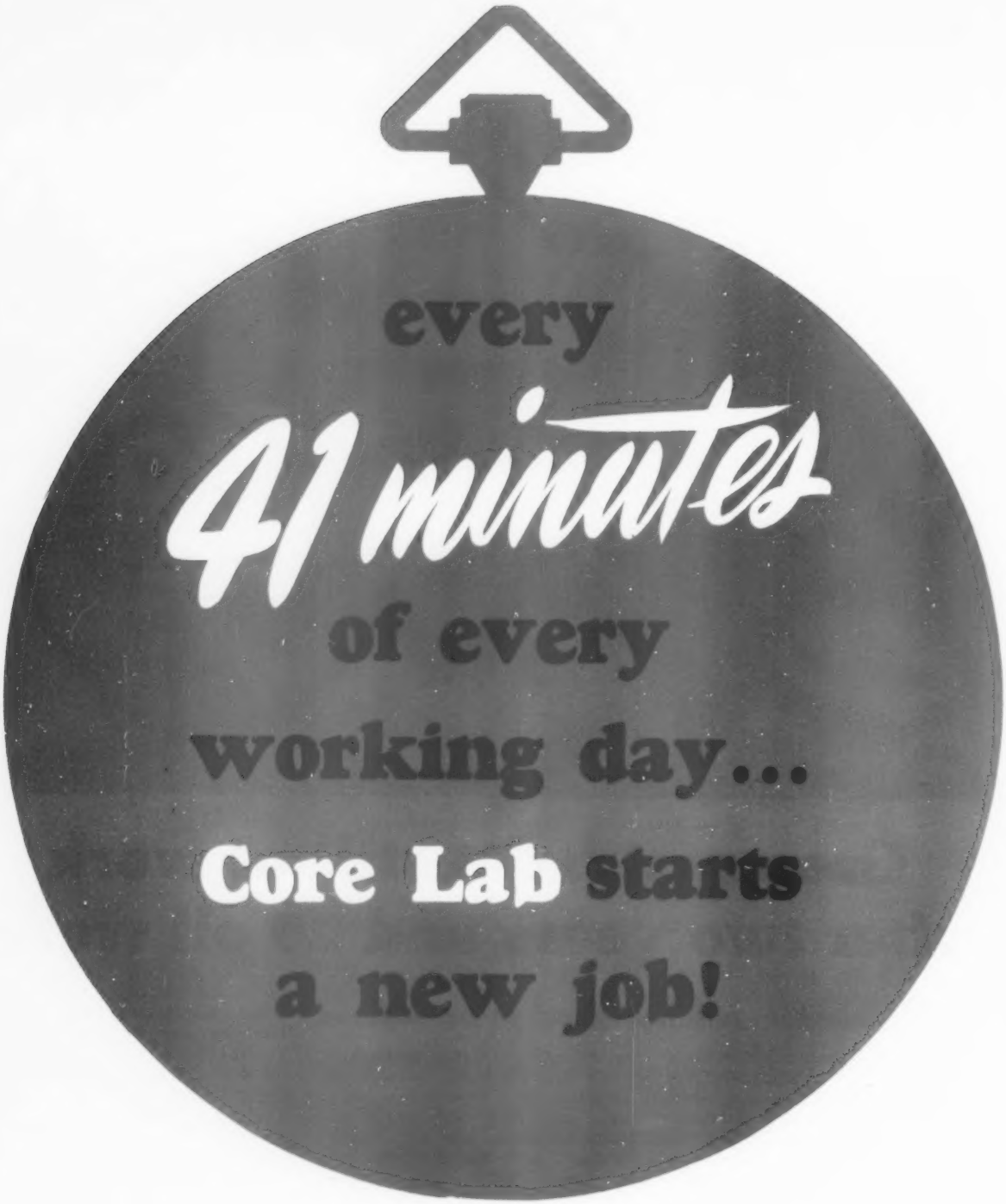

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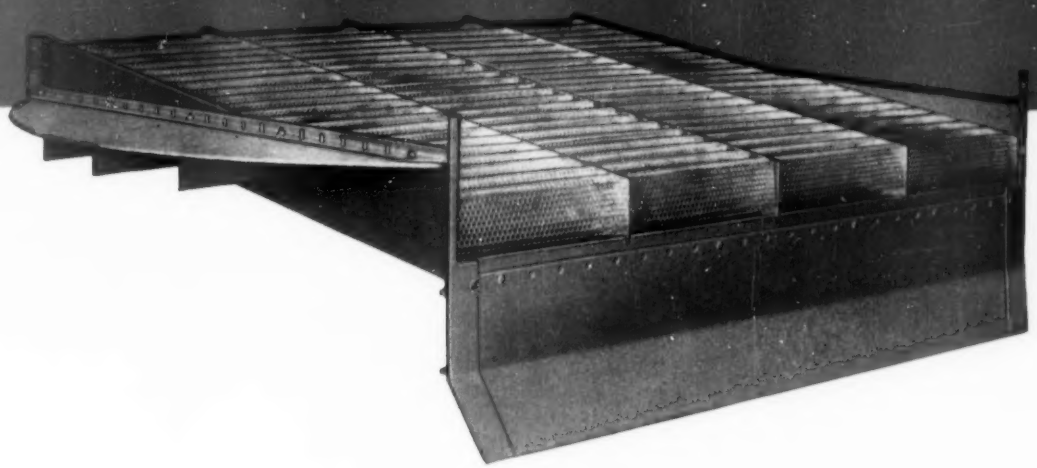

CASE HISTORY No. 1 . . .

One refiner was operating a 7.5' vacuum tower which was limiting capacity and yields due to the pressure drop of existing bubble trays. Capacity desired was:

Vapor . . . . 24,600 #/hr of 0.0137 #/cf density
Liquid . . . . . 36,400 #/hr of 58.3 #/cf density

This refiner replaced the bubble trays with "Benturi" Kaskade trays on the same supports, and is now obtaining a pressure drop of less than 1.0 mm hg pressure drop per tray.

CASE HISTORY No. 2 . . .

An engineering firm recognized a pressure drop problem with a process duty equivalent to:

Vapor . . . . . 35,500 #/hr of 0.26 #/cf density
Liquid . . . . . 965,000 #/hr of 62.4 #/cf density

Yet, multi-pass "Benturi" Kaskade trays in a 7.5' diameter column gave them less than 2.0 mm pressure drop per tray.

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Here's how *Life-Line* motors and controls reduce service problems at remote locations

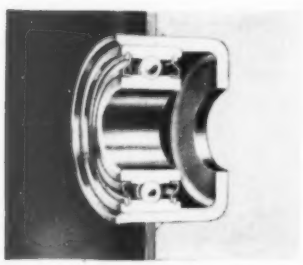
How much does it cost to operate and maintain this remote pumping station? It adds up to a lot less today . . . thanks to a Westinghouse motor and pumping control that releases hundreds of man-hours a year for more profitable work.

For instance, the pump control time switch automatically takes care of cyclical pumping. You can prearrange for one or more periods of pumping with intervening shutdown during a 24-hour period. In addition, you can provide for one or more full days of shutdown, grouped or spaced as desired, throughout the week.

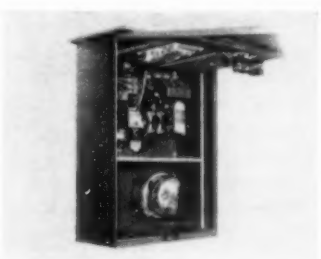
The oil-well pumping control includes the Westinghouse AB circuit breaker or fusible disconnect and Life-Line Starter to protect against current faults and overloads. A lightning arrester is built into the starter to give maximum protection against lightning surges and static discharges. Front mounted and wired, these control units are completely protected by an all-weather steel, Bonderized® enclosure suitable for pole mounting.

You can forget this Life-Line® motor as far as frequent servicing is concerned, but you won't forget the dependable service it gives. Life-Line pre-lubricated ball bearings are greased for life. Grease stays in; dirt stays out. On the inside, motor coils are wound of rugged "Tufvar®" wire . . . permanently insulated against water, dirt, and grease. The steel motor housing and feet stave off damaging blows effectively. Splashproof enclosure completes this fully protected motor.

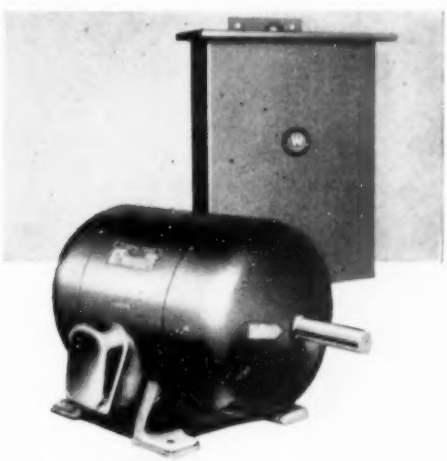
Motors and Controls for the Petroleum Field is the name of the new Westinghouse booklet, B-5444, available now from your local Westinghouse representative. Call him today, or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. J-21726



Pre-lubricated bearings have the proper lubricant sealed in at the factory. Greasing schedules can be forgotten. Special seals guard against the entrance of dust, dirt or other foreign matter that might cause failure.



Oil-well pumping control is completely self-contained in weatherproof, dead-front enclosure. Protects motor and circuit against overload, fault and lightning. Permits automatic cycling of pumping operation.



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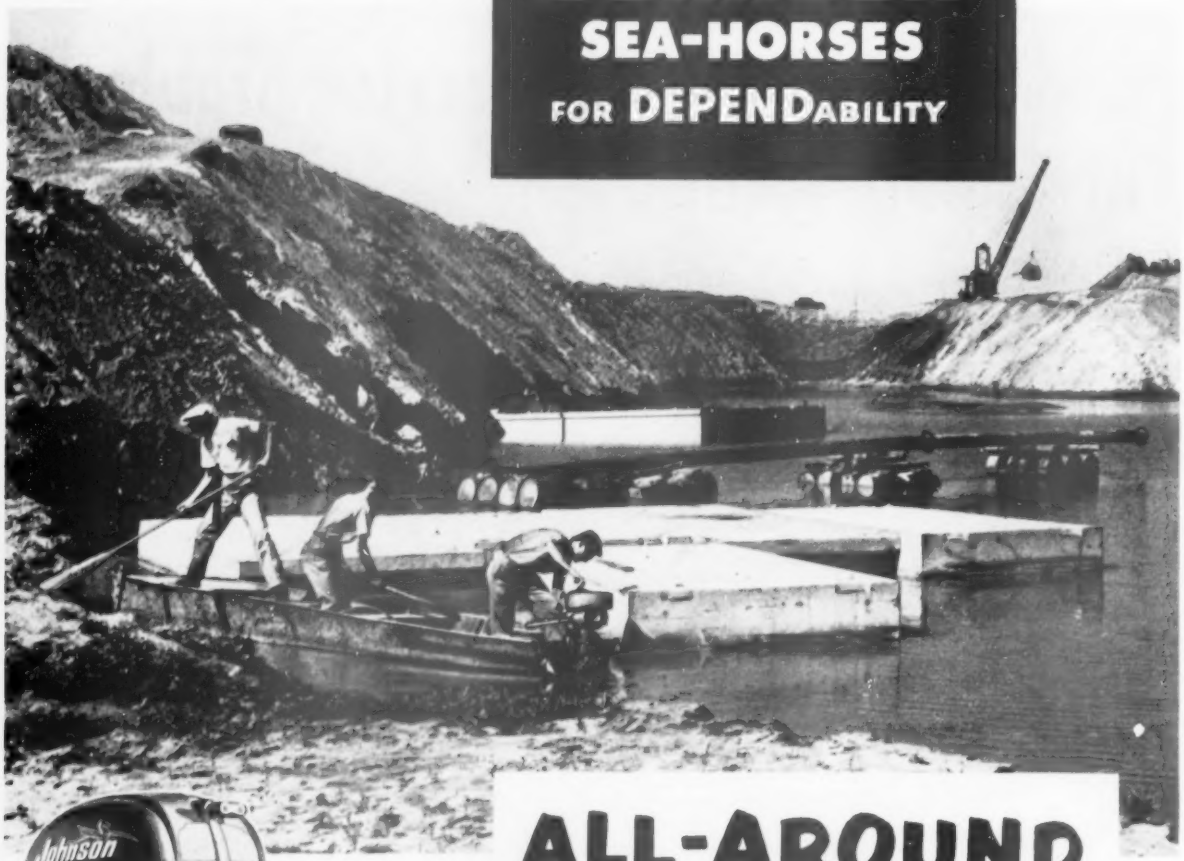

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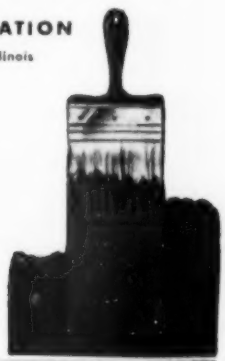

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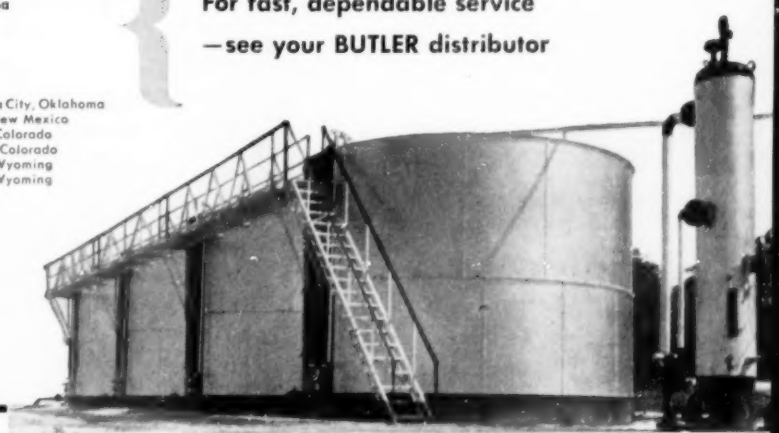

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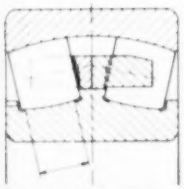
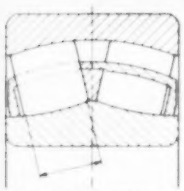
capacity

of spherical roller bearings 25% to 50% by means of improved internal design



BEARING 22315

This is the Spherical Roller Bearing design originated by SKF *more than 30 years ago*. The cross-section shows how the integral inner ring flanges, and the undercuts adjacent thereto, limit the effective length of the rollers.



BEARING 22315C

Here is the *latest* SKF improvement, a *revolutionary advance in design*. Effective roller guiding is accomplished by means of a separate ring. This eliminates the need for undercuts! This type of guide ring permits the rollers to take the position which their contact with the rings dictates. This assures uniform load distribution over the entire length of the longer rollers at all times. *Result*—greatly increased capacity and life.

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SKF Sales Engineers in our District Offices throughout the country will assist you in making use of the important advantages of the improved internal design of SKF Spherical Roller Bearings.

7423 A

This 12-page booklet gives you additional facts—sizes available—added capacity, size by size—increased life you can expect for each size—dimensional tabulations—and load and speed data. Write for your free copy of Bulletin 365-1 now.

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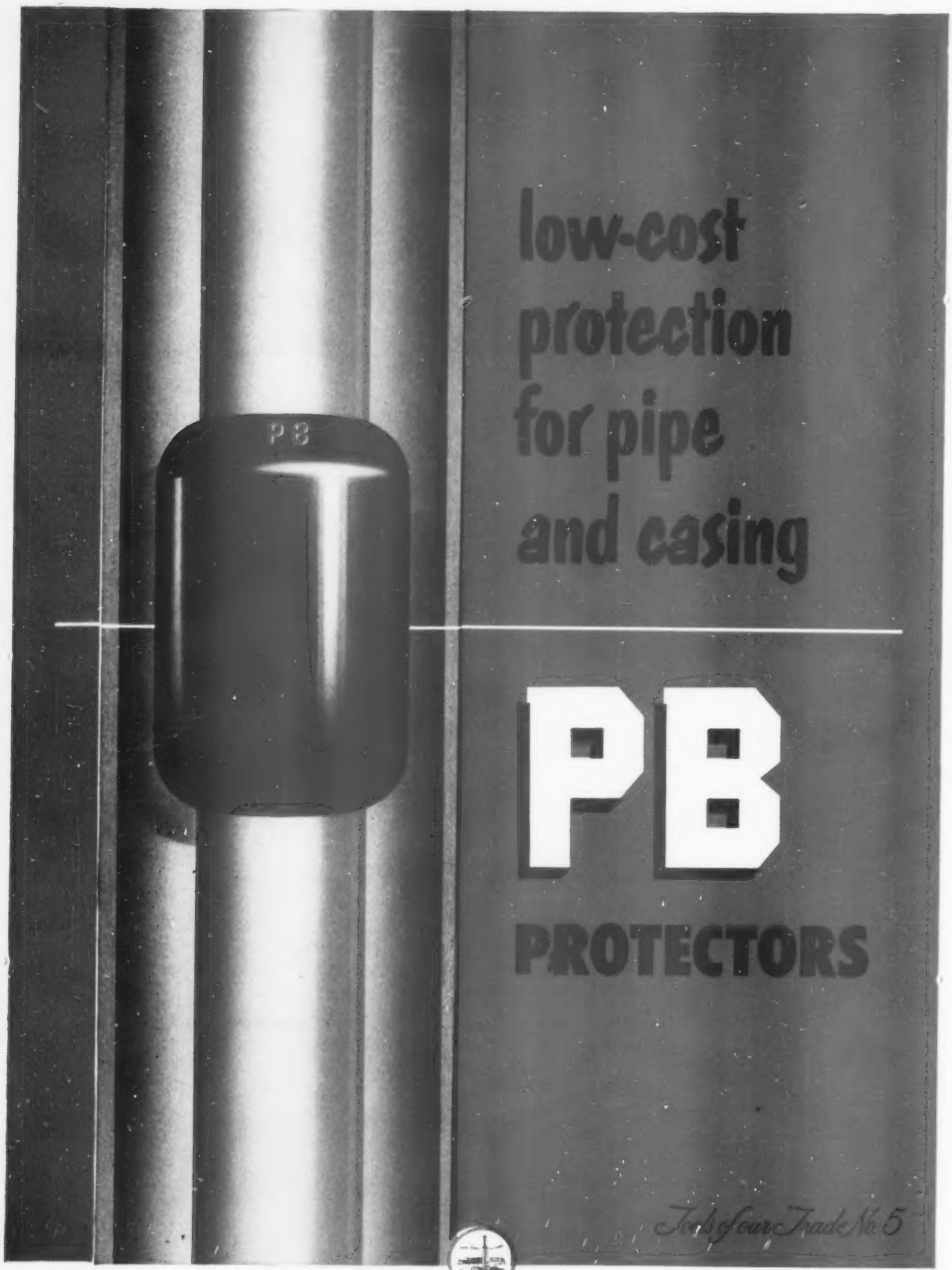

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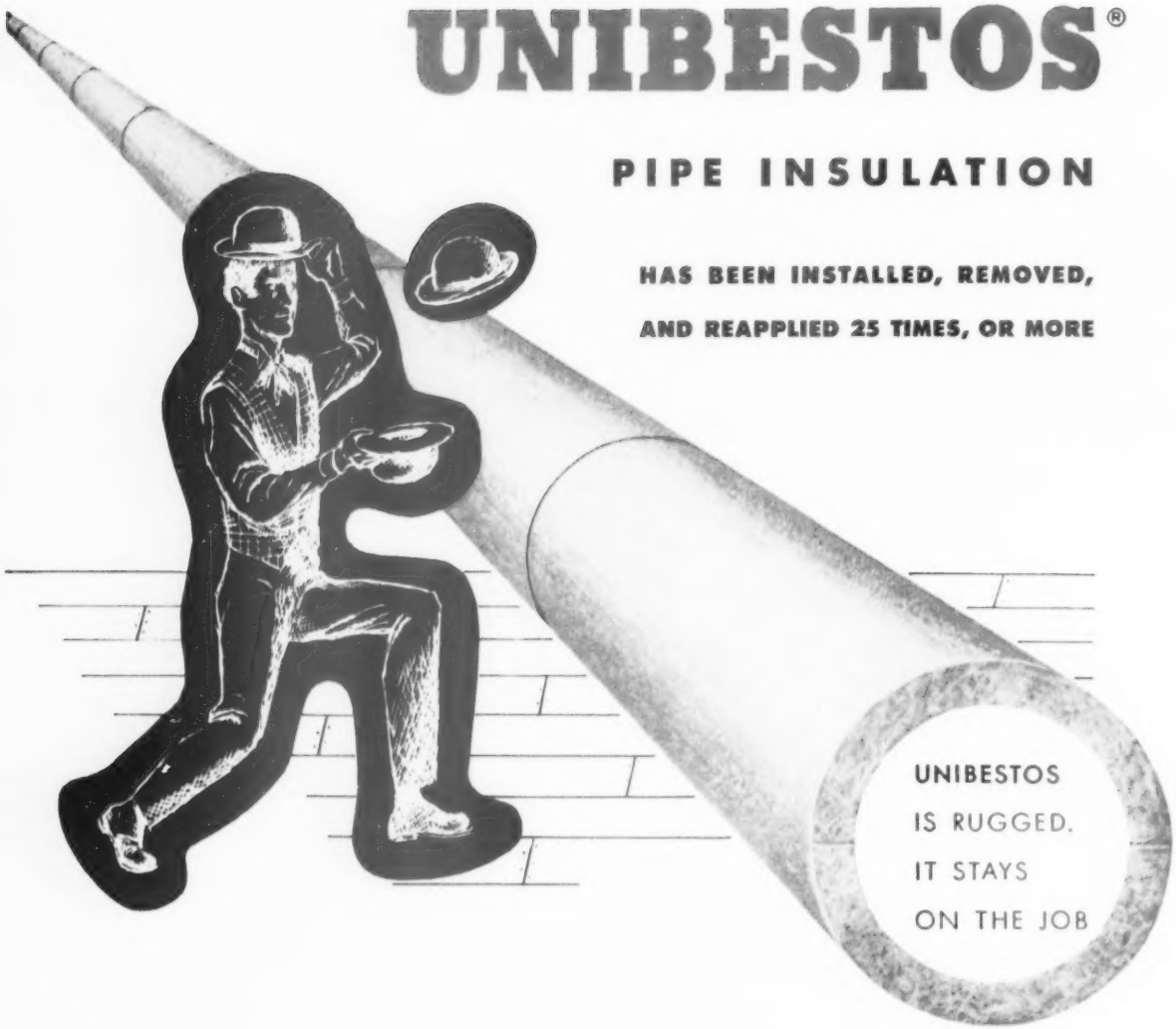

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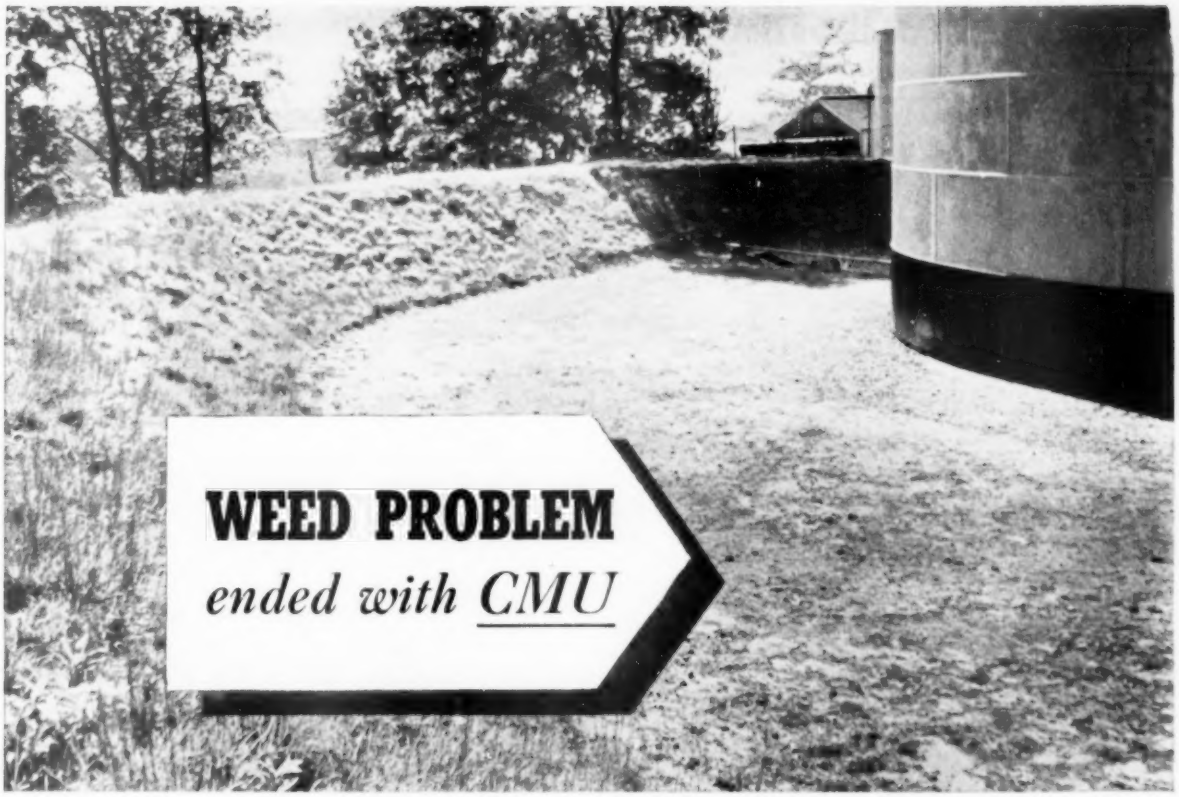

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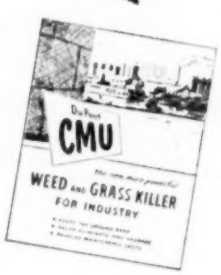

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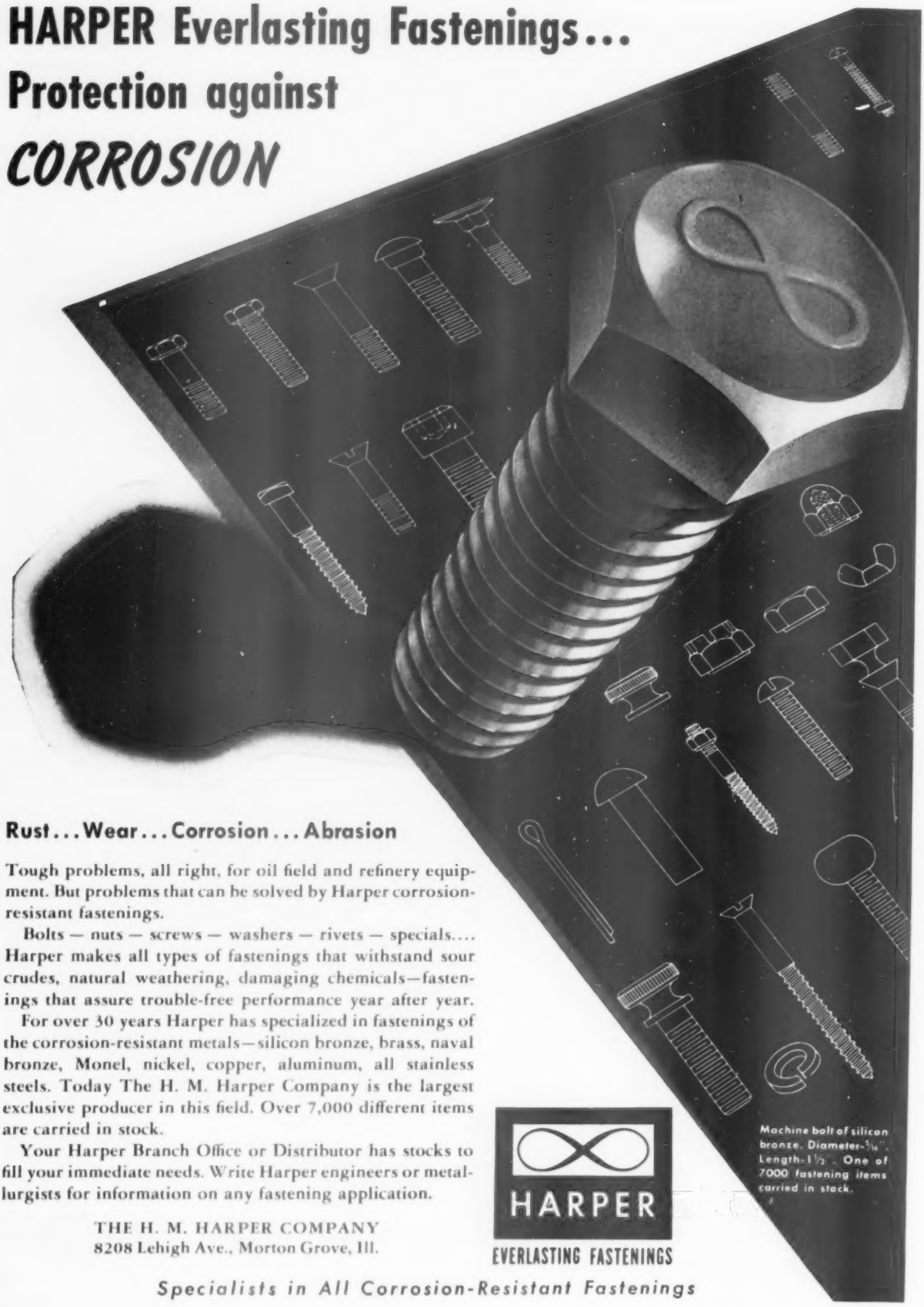

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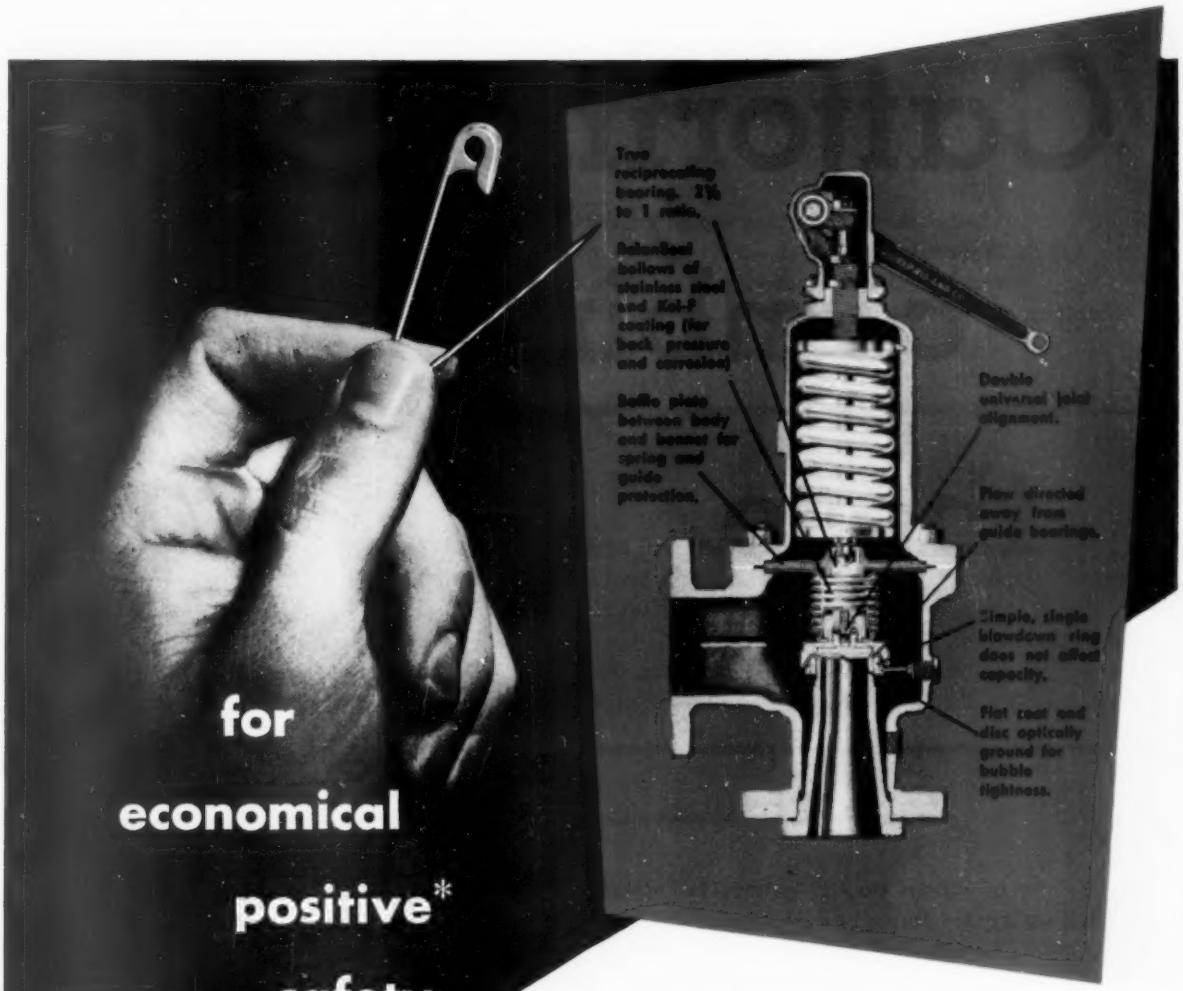

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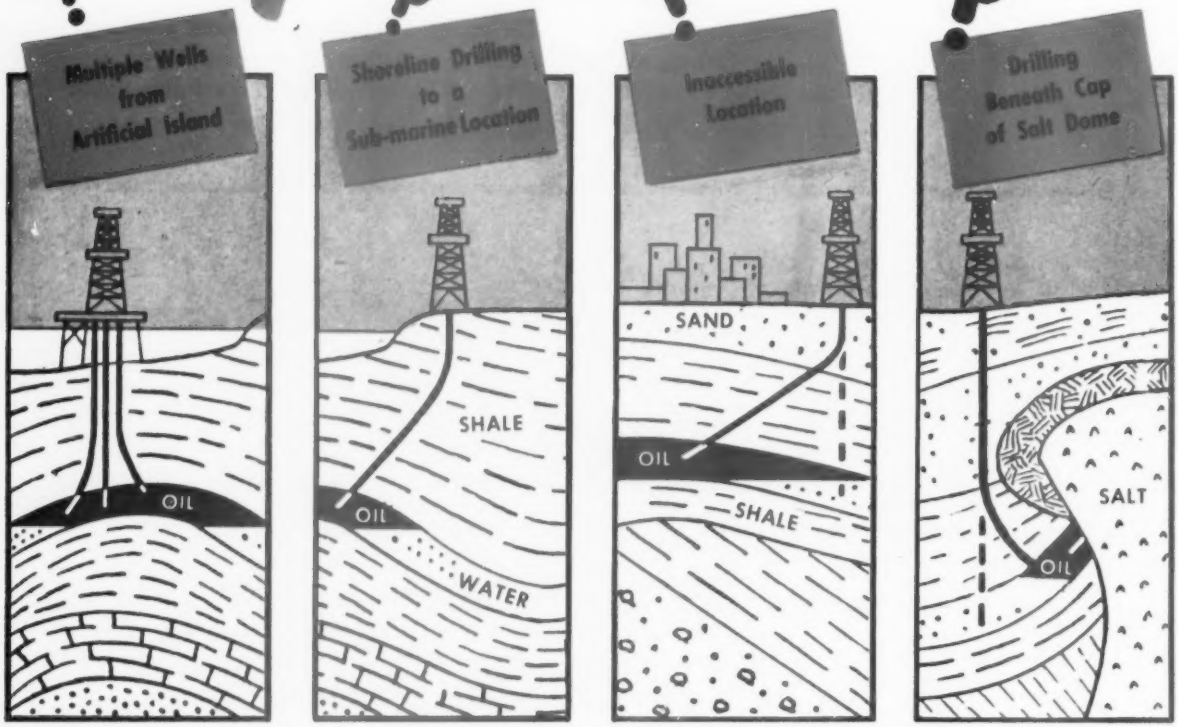

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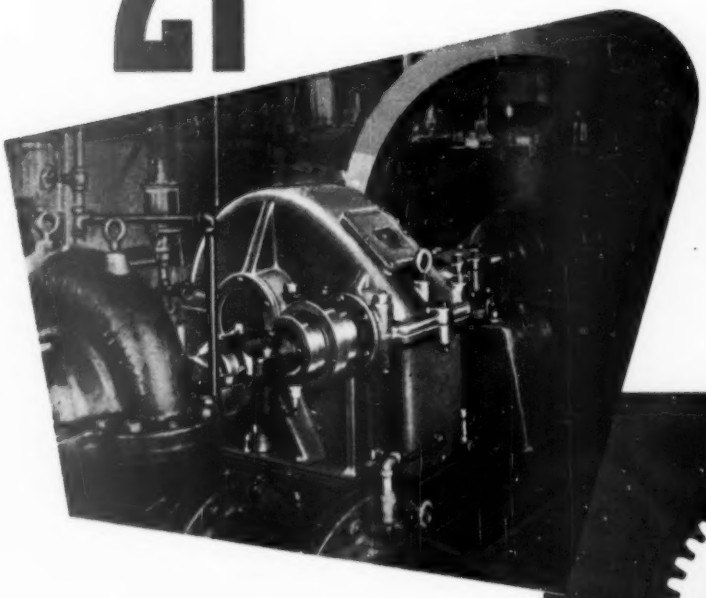

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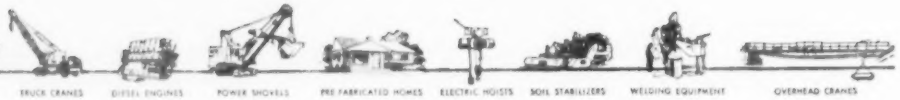

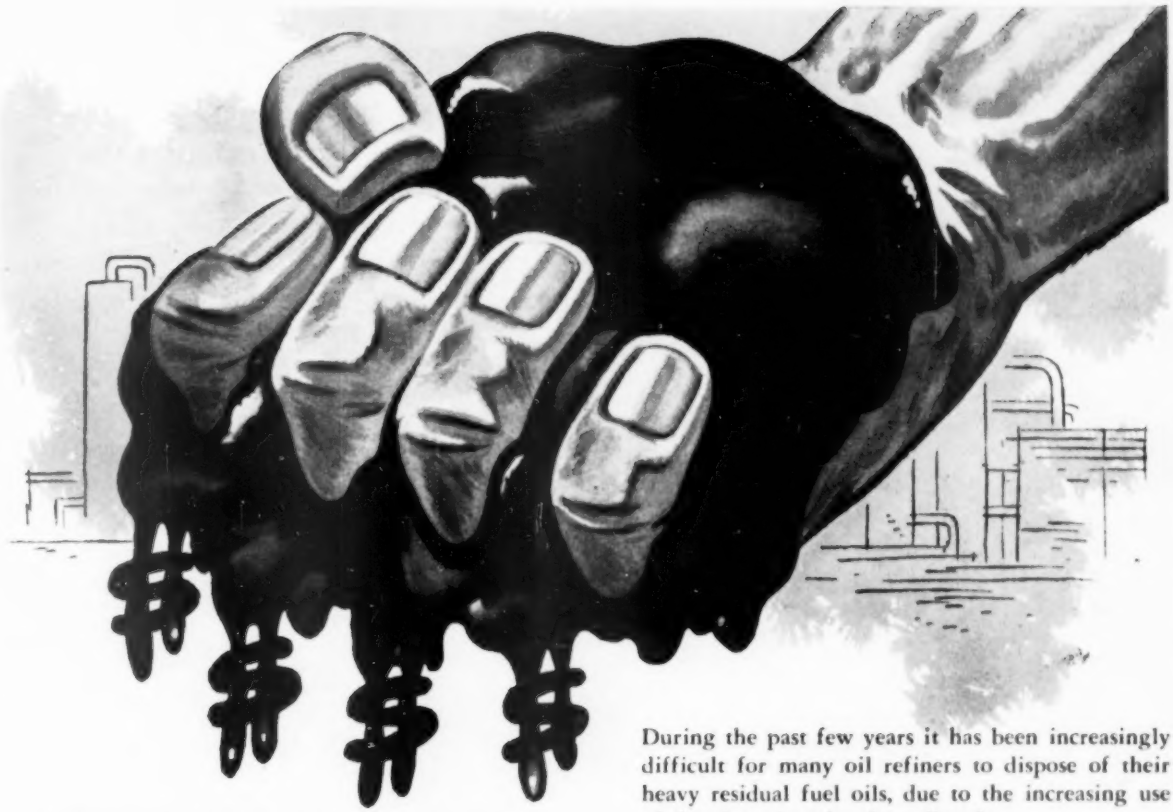

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During the past few years it has been increasingly difficult for many oil refiners to dispose of their heavy residual fuel oils, due to the increasing use of diesel engines by the railroads.

The solution to this problem is the installation of a "Continuous Fluid Coking" unit, engineered and constructed by TRECO. This helps conserve national petroleum resources by making more gasoline and home heating oil from the same amount of crude, with greater profits to the refiner. The process will also aid in the exploitation of reserves of very low grade crude oils which until now could not be economically refined, and offers a greatly improved process.

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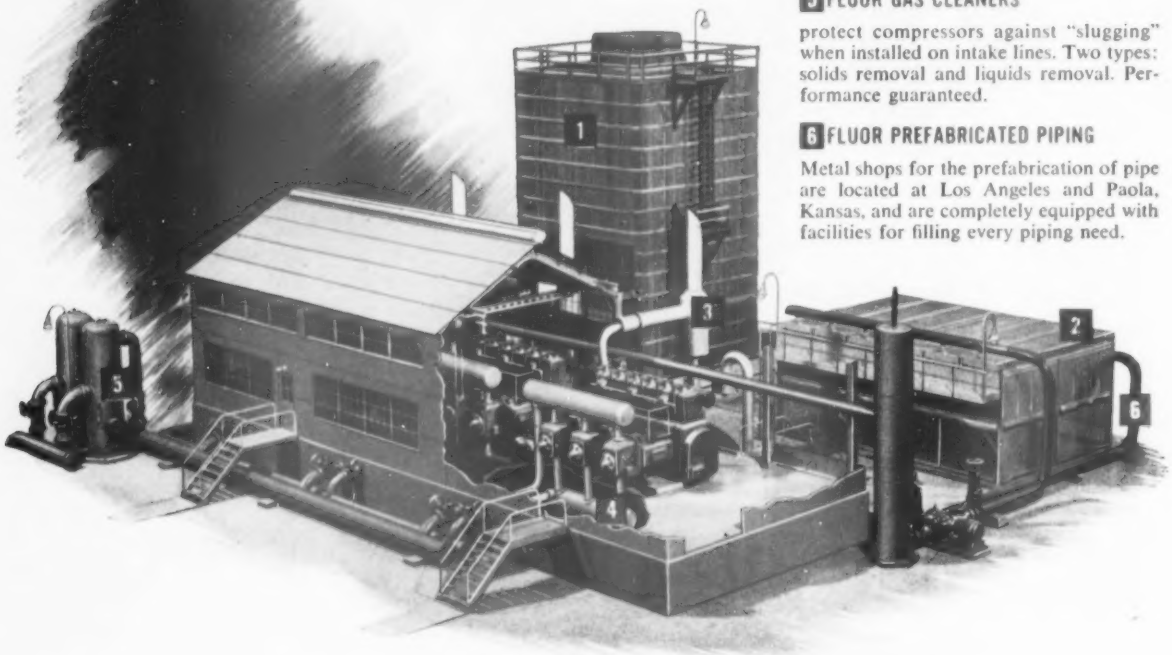

This miniature compressor station which was on display at the Oil Show in Tulsa, Oklahoma, shows exactly how Fluor products and services provide a compressor station with greater efficiency. The Fluor Counterflo Coilshed Cooling Tower is cooling compressed natural gas. Engine jacket water and lube oil cooling is being performed by a Fluor Fin-Fan Air Cooled Heat Exchanger. Fluor Mufflers abate engine noise while Pulsation Dampeners convert a pulsating gas flow into a steady, even stream. Fluor Gas Cleaners on the intake side of a plant remove both solids and liquids from gas, and all units are connected with Fluor Prefabricated Piping. Fluor not only manufactures these specialized products, but also contracts for the design, construction and expansion of complete compressor stations.

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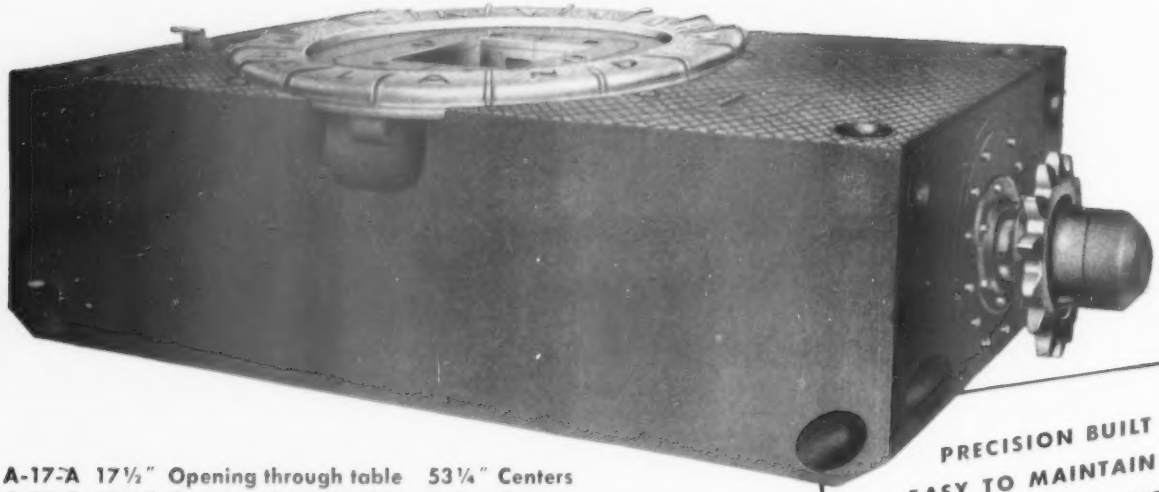

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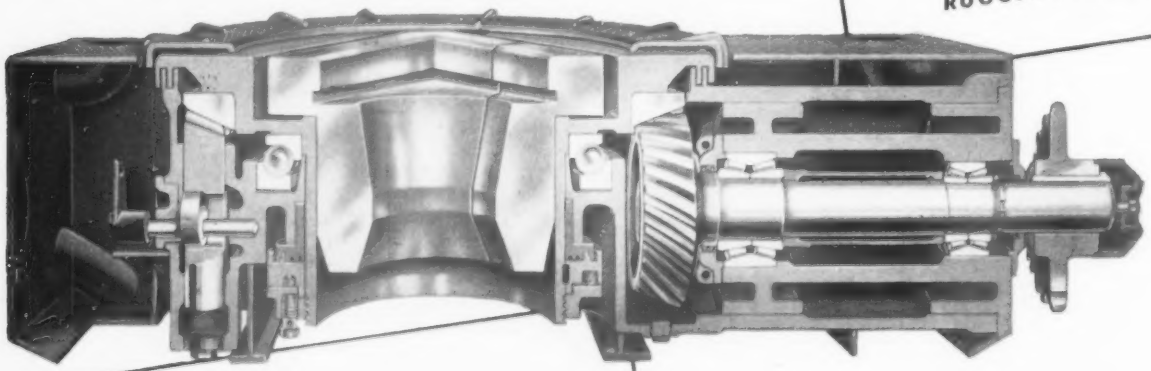

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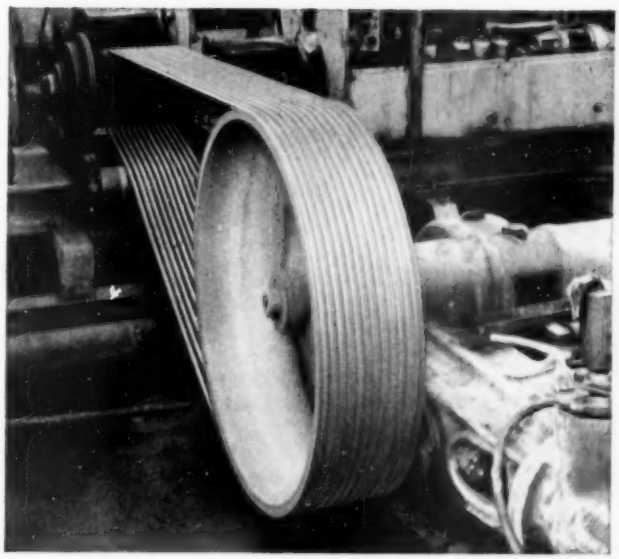

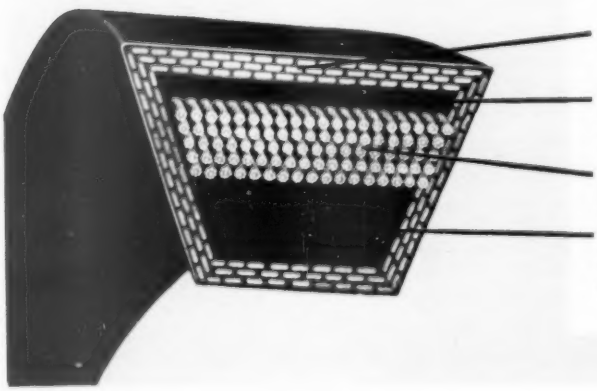

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YOU *helped create this superior Recording Oscillograph*

NEW *Type 5-119*

CONSOLIDATED'S new Type 5-119 Oscillograph was designed and built to customer specifications. Many major users were interviewed by our design engineers to determine the features desired in a "perfect" instrument. Foremost demand was for great dependability. Second need indicated was for high trace capacity.

Dependability is achieved by extensive warning and test circuits and by reserve lamps which assure continuous recording in the event of lamp burn-out. Indicators warn immediately of any condition which could cause data loss, while additional circuits permit quick testing of the warning system. Design of the instrument assures reliable operation under the most rigorous environmental conditions.

Standard models provide either 36 or 50 traces. Consolidated's new Series 7-300 Galvanometers provide frequency response flat to 3000 cps. Standard record width of 12" greatly simplifies record interpretation. Only after several prototypes were successfully tested under actual field conditions did we go into production on the 5-119—the new recording oscillograph leader. Write for Bulletin CEC 1536-X1.

SPECIFICATIONS

TRACE CAPACITY	36 or 50-trace models available
TRACE IDENTIFICATION	repeated, sequential trace breaks
RECORD WIDTH	12" standard; narrower widths adaptable
RECORD MAGAZINE	removable, integral type; holds 250' paper or film
RECORD SPEEDS	0.10 to 100 inches per sec. through quick-change gears, instantaneous switch-actuated, 10:1 speed jump
SCANNING SYSTEM	ground-glass screen and adjustable motor-driven polygon mirror; timing lines show on viewing screen
REMOTE OPERATION	accessory control unit with all essential controls & indicators
TIMING PROVISIONS	0.10 and/or 0.01 sec. lines photographed across record
EVENT NUMBERING	high-speed flash system operates as rapidly as one number per sec.
POWER REQUIREMENTS	115 volt, 60 cycle and 26 volt d-c models
INPUT PROVISIONS	all connectors on one rear deck; individual galvanometer plugs
CONTROL PANEL	all controls and indicators on single panel
ACCESSIBILITY	all adjustments can be made from one surface

The 5-119 can be panel mounted vertically with special shockmounts.

Consolidated Engineering

CORPORATION

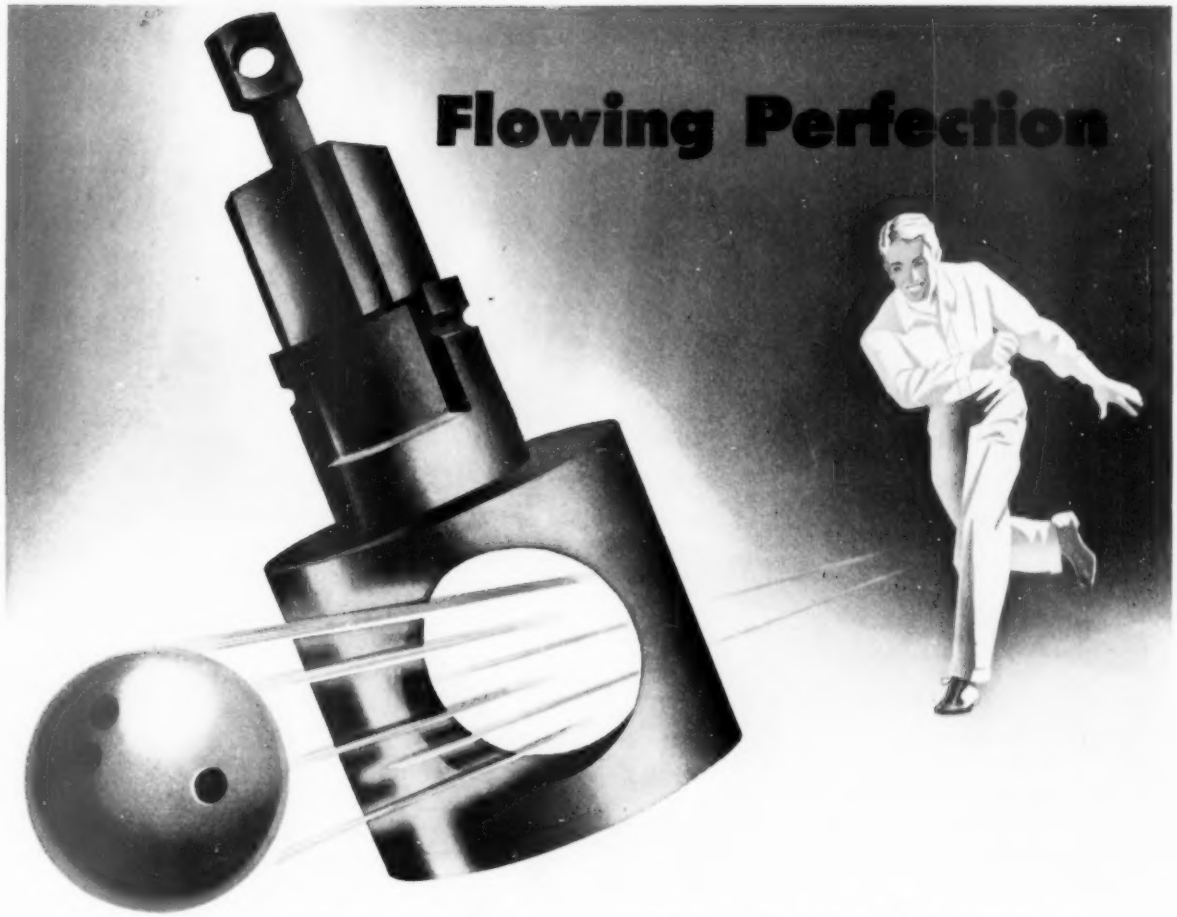
300 North Sierra Madre Villa, Pasadena 15, California

Sales and Service through **CEC INSTRUMENTS, INC.,** *a subsidiary with offices in: Pasadena, New York, Chicago, Washington, D. C., Philadelphia, Dallas.*

analytical instruments for science and industry

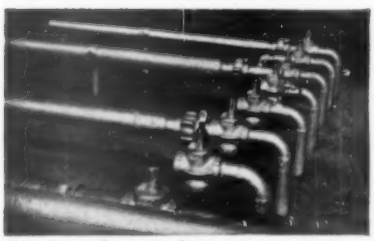
Recording Oscillographs

The Type 5-119 is the newest of 7 Consolidated Oscillographs ranging from 9 to 50 channel capacity. These versatile instruments simultaneously record any physical phenomena that can be transformed into electrical impulses. All measurements are obtained in clear, permanent form during the same operational cycle for future detailed analysis.

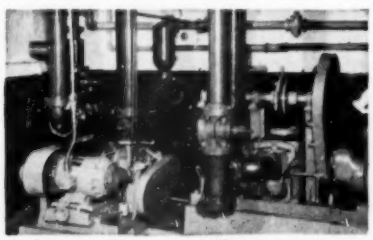


Straight through, clean as a whistle! That's the kind of *flow perfection* you get with an a.c.f. Round Port Valve. Because they're the exact same size and shape as the pipe itself, there are no obstructions. You *always* get full capacity flow of heavy viscous ladings... without loss in head pressure. There are no abrasive effects from solids in suspension.

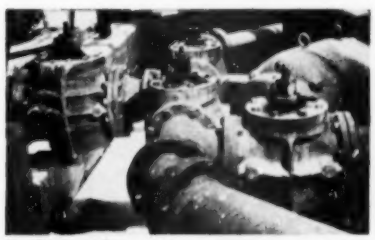
The full pipe area and non-wedging effects of Round Port Valves are also found in a.c.f. Rectangular Port Valves. Both are designed to give you long, trouble-free service with minimum maintenance. Don't settle for less than the very best. It pays!



The Petroleum Industry finds full-pipe area of a.c.f. Valves of great advantage on both natural gas and crude oil



In Sewage Treatment Plants the a.c.f. exclusive Cylindrical Plug shears obstructions, provides uninterrupted flow.



In Processing a.c.f. Round Port Valves are 100% obstruction free, ideal for handling materials in suspension.

a.c.f. CYLINDRICAL FULL PIPE AREA **PLUG VALVES**

Write for Catalog 4-OG, American Car and Foundry Company, Valve Division, 1501 E. Ferry Ave., Detroit 11, Michigan

Representatives in 50 Principal Cities

JONES SUCKER RODS

More operators are utilizing the valuable assistance available through Jones trained Field Engineers in selecting the right type rods and designing rod strings tailored to individual pumping conditions. Jones recommendations are based upon scientific facts backed by experience.

PESA

THE S. M. JONES COMPANY
Division of Buffalo Eclipse Corporation
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

LOOK FOR THE GREEN RODS

You'll Save Thousands of Dollars...

with

PARKERSBURG

Air Balanced

PUMPERS

EASIER BALANCING

Changing the counterbalance is as simple and easy as turning a valve. The counterbalance adjusts itself automatically to any setting. The new Parkersburg Time Compensator automatically keeps the counterbalance adjusted.

TWO-STAGE PUMPING SYSTEM

The Two-Stage Pumping System employed for building up the counterbalance is much simpler and more efficient than compressors.

QUALITY CONSTRUCTION

They are built to meet the standard of quality and over the years this pays dividends that more than offset their slightly higher first cost.

LOWER MAINTENANCE COSTS

One operator who tested them against conventional type pumpers and gas lifts saved up to $5000 per year on a single well on maintenance costs alone.

LESS INSTALLATION COSTS

You do not need the heavy, expensive concrete foundations required for standard pumpers. Air Balanced Pumpers require only about 60% of the amount of foundation called for in standard pumper installations.

LESS ROD REPLACEMENT

Parkersburg Air Balanced Pumpers develop lower polish rod loads than standard pumpers employing crank and beam weight counterbalance. This will save you thousands of dollars in downtime, lost production and rod replacements.

No. 5321

PARKERSBURG

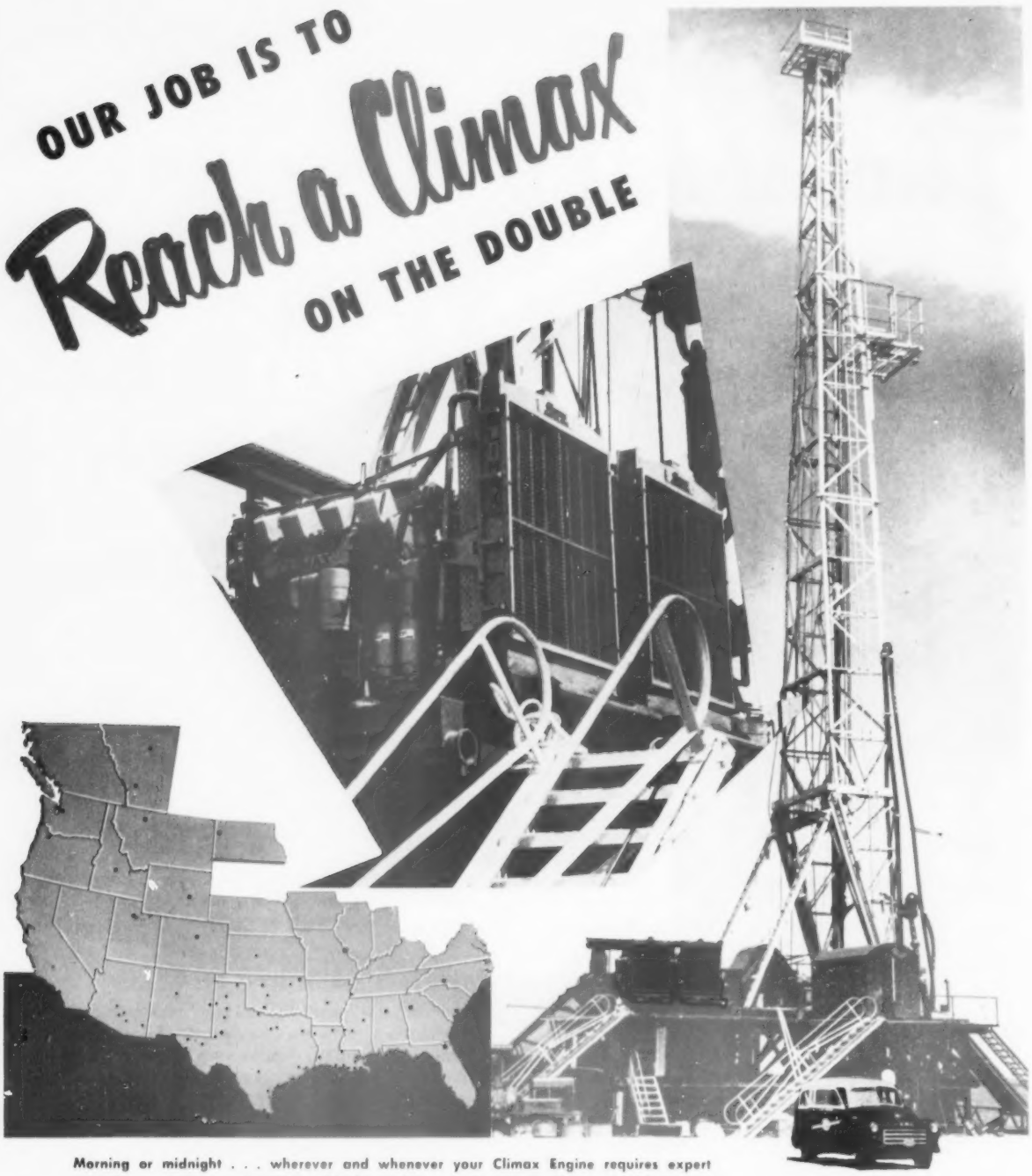
PUMPERS *Air Balanced • Chain Driven • Gear Driven*

Manufactured in Coffeyville, Kansas

OUR JOB IS TO

Reach a Climax

ON THE DOUBLE

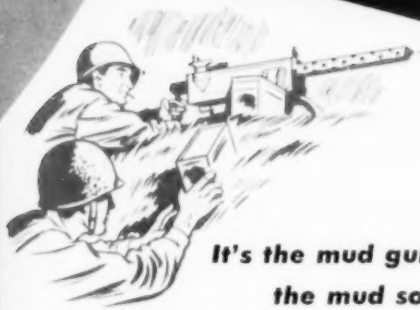


Morning or midnight . . . wherever and whenever your Climax Engine requires expert attention . . . your nearby Climax Distributor loses no time in reaching you with famous Blue Streak Service. His detailed knowledge of power-packed Climax Engines enables him to provide fast, economical service . . . the kind of service that assures you of the smooth, dependable power that has made Climax the number one name in engines. So the next time your engines need service, call your Climax Distributor. You will find him thoroughly equipped with a complete stock of parts as well as the most modern repair facilities in the engine field. And remember . . . wherever you operate there is a Climax Distributor within two hours of your location.

climax BLUE STREAK ENGINES

Made by CLIMAX ENGINE AND PUMP MFG. CO. Factory and General Offices: Clinton, Iowa. Oil Field Sales Office: 155 Continental Ave., Dallas, Texas.

This GUN Keeps Shooting... IN PEACE OR WAR



It's the mud gun that mixes the mud so essential to sinking those holes in Mother Earth to keep us supplied with oil.

NON-SPIN MUD MIXING GUN

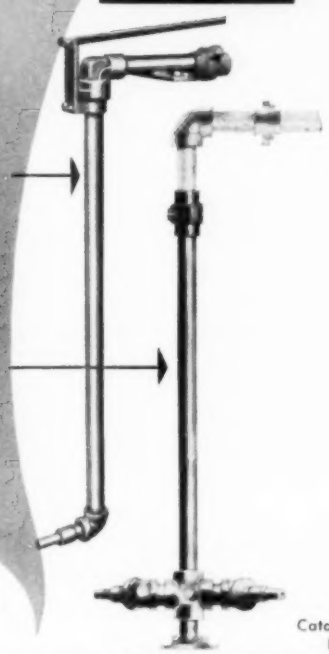
The CHIKSAN *Non-Spin* Mud Gun illustrated above can't spin because centrifugal force is neutralized by the offset in the barrel of the gun. Perforated flanges and Locking Pins permit locking the Gun in any desired position.

BOTTOM TYPE MUD MIXING GUN

The CHIKSAN *Bottom Type* Mud Gun is designed for use where large size metal tanks are employed as mud pits. It is simple in construction, easy to install, and easy to operate.

SPINNER TYPE MUD MIXING GUN

The CHIKSAN *Spinner Type* Mud Gun is designed for use in tanks where the utmost in constant agitation is desired. The nozzles are set at an angle and the pressure in the line imparts a spinning motion which is accommodated by a Style No. 20 CHIKSAN High Pressure Swivel Joint. Furnished in any desired length as specified on order.



It requires a tremendous volume of petroleum products to keep us on the go—whether to hold a war plane upstairs or make a factory hum—to send tanks into enemy terrain—keep ships afloat—to help a mower cut a swath through a peaceful golf course.

Chiksan mud guns represent a low cost investment, yet provide complete safety, versatility, and flexibility in the drilling operation. The heart of these guns is the Chiksan Ball-Bearing Swivel Joint, made of tough, hardened metal with long life to keep up the flow of oil that keeps up the flow of industry and defense.

There's hardly an industry, large or small, that can't add flexibility to its operation and decrease upkeep by the use of Chiksan Ball-Bearing Swivel Joints.

Dairy and dockside—food processing and chemical plant—oil field and railroad loading platform—wherever liquid or gas must flow, wherever pressure, heat or cold subjects material and process to fatiguing punishment, there you will find Chiksan on the job—speeding production—cutting down operating overhead.

Write for Catalog No. 52-3-D Dept. OGJ-9

If plant, process or product needs speeding or improving—if flow of liquid or gas or flexibility of metal is a factor, call upon the Research & Development Division of Chiksan. There's probably a better method awaiting your service that Chiksan has proved in performance or can devise for your special need.

The Flow of Enterprise Relies on **CHIKSAN**

Ball-Bearing Swivel Joints

CHIKSAN TRADE MARK REG.

Representatives in Principal Cities
Sold by Leading Supply Stores Everywhere

CHIKSAN COMPANY • BREA, CALIFORNIA • Chicago 28, Illinois • Newark 2, New Jersey

Well Equipment Mfg. Corp. (Division), Houston 1, Texas • Chiksan Export Company (Subsidiary), Brea, California • Newark 2, N. J.

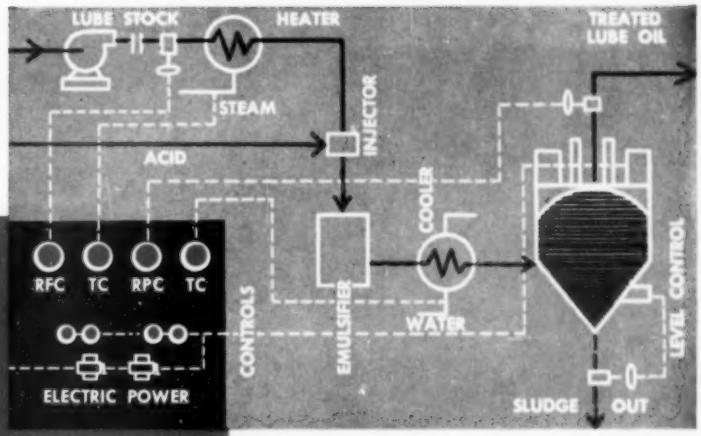
PETRECO ELECTRIC LUBE O

A CONTINUOUS AUTOMATICALLY CONTROLLED PROCESS IN A CLOSED SYSTEM FOR ACID TREATING LUBE OIL AND SIMILAR STOCK

PETRECO

	ELECTRIC PETROLEUM PROCESSING
CRUDE OILS	*Removal of salts, solids, other impurities; dehydrating*
LUBE OILS	*Continuous, automatic acid treating*
DISTILLATES	*Acid treating, caustic treating, doctor treating*
FUEL OILS	*Desaponification, ash removal*

IL TREATING



NOTE THESE PETRECO ADVANTAGES

HIGH EFFICIENCY: Intense contacting and powerful sludge precipitation yield better treating with less acid usage.

MINIMUM OIL LOSS: Loss of oil due to entrainment in sludge is nil or negligible.

REDUCED SLUDGE DISPOSAL: Because less acid is required for treatment, there is less sludge for disposal.

MINIMUM MAINTENANCE: Maintenance and repairs are minimized, since there are essentially no moving parts.

CLOSED SYSTEM: Treating in a closed system, under pressure, obviates the nuisance of escaped fumes.

FLEXIBILITY: Various stocks can be treated at the optimum temperatures and rates.

Petreco electric lube oil treating has all the inherent advantages of continuous, automatic operation, plus the powerful coalescing and precipitating action of the electric field. These features permit treating speed and efficiency unattainable in batch-agitator treating. Petreco processing virtually replaces the "art" of acid treating with modern, engineered, automatic processing.

Petreco laboratory facilities are available, without obligation or expense to the customer, for making pilot plant runs. Write or call for complete information.

For complete information, call or write

PETROLITE CORPORATION

PETRECO

DIVISION

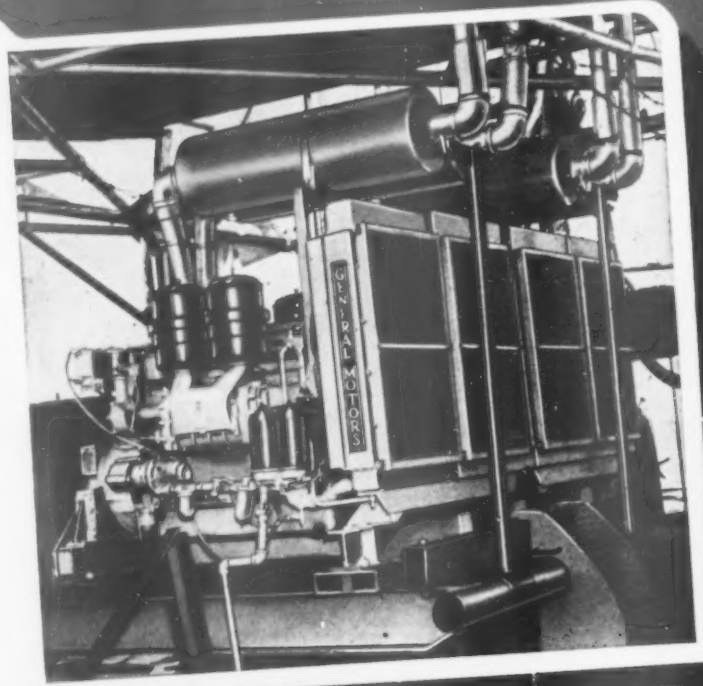
3202 So. Wayside Drive, Houston 1, Texas
1390 E. Burnett Street, Long Beach 6, Calif.

GM Diesel
Case History No. ID2B-73

OWNER: Oxford Drilling Co., Albany, Texas

INSTALLATION: Two GM 6-71 Twin Diesels, powering a mud pump and Wilson Giant draw works. Twins replaced two large gas engines.

PERFORMANCE: One of the partners and Drilling Supt. R. W. Oxford reports, "The GM Diesels on this rig operated 20,000 hours without requiring an overhaul. They are faster accelerating, make quicker round trips, and are much more economical on repairs and fuel."



It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL POWER

Drilled 20,000 Hours Without Overhaul

Here's another contractor who has cut drilling costs by switching to dependable General Motors Diesel oil field engines. He increased his footage because fast-stepping 2-cycle operation cut trip time. His maintenance costs dropped because the rugged design of a GM Diesel makes this engine run dependably long after others have become troublesome and inefficient.

What's more, compact size of GM Diesel units makes them easier and cheaper to move—simple design makes preventive maintenance an easy routine—low cost of parts keeps overhaul expense at a minimum. These are among the reasons why this engine is America's *favorite* oil field Diesel. Contact your nearest distributor or write us for a copy of the new catalog describing the complete line of GM Diesel oil field engines.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

GENERAL MOTORS CORP., DIESEL ENGINE SALES, PETROLEUM INDUSTRY, 1504 PHILTOWER BLDG., TULSA, OKLAHOMA

ALABAMA—Montgomery 1
ALABAMA MACHINERY & SUPPLY CO.

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LAWLESS BROTHERS

Berkeley
WEST COAST ENGINE & EQUIPMENT CO.

Los Angeles 21
ANDERSON-O'BRIEN CO.

COLORADO—Denver 9
THE COLORADO BUILDERS' SUPPLY CO.

ILLINOIS—Centralia
WESTERN MACHINERY & ENGINE CO.

ILLINOIS—Mt. Carmel
WESTERN SERVICES

KANSAS—Wichita
DIESEL EQUIPMENT CO., INC.

LOUISIANA—Harvey
GEORGE ENGINE CO., INC.

Shreveport
UNITED TOOL COMPANY

MICHIGAN—Detroit 4
THE EARLE EQUIPMENT CO.

MISSOURI—St. Louis 10
WESTERN MACHINERY & ENGINE CO.

MONTANA—Billings
SEITZ MACHINERY CO., INC.

Missoula
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THE HARRY CORNELIUS COMPANY

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SWEENEY BROTHERS TRACTOR CO.

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SWEENEY BROTHERS

OKLAHOMA—Oklahoma City
DIESEL POWER CO.

TEXAS—Brownsville—Corpus Christi—Dallas—Houston—Lubbock—McAllen (San Juan)—Odessa—Wichita Falls
STEWART & STEVENSON SERVICES, INC.

Plainview
DIESEL POWER, INC.

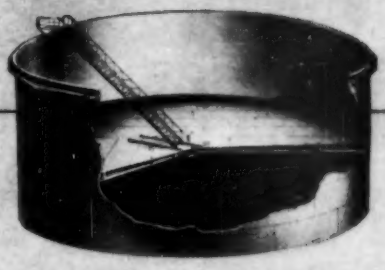
UTAH—Salt Lake City 4
CATE EQUIPMENT COMPANY

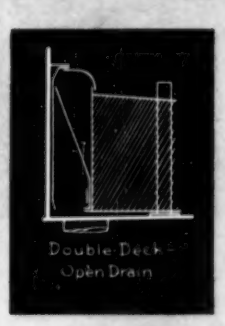
WYOMING—Casper
THE COLORADO BUILDERS' SUPPLY CO.

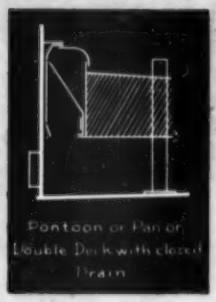
operators of floating roof tanks

You can get...

substantially more capacity from HAMMOND springtite seal floating roof tanks







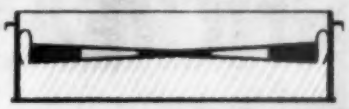
because: they can be made to travel right down to the floor of the tank, thus permitting *all of the tank capacity to be used.*

There are no fittings or supports to take up valuable storage space in Hammond designed and built Floating Roof Tanks . . . their Springtite Seal Floating Roofs can travel from the top of the tank right down to the floor so that all of the tank capacity can be used . . . this design and construction in no way sacrifices any of the values required of a floating roof tank.

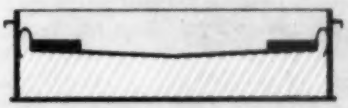
Hammond Floating Roofs reduce evaporation and breathing losses, eliminate filling losses, minimize fire hazards and decrease corrosion

. . . and they permit all of the tank capacity to be used.

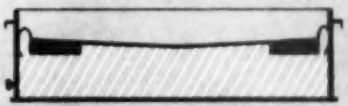
HAMMOND FEATURES THREE TYPES OF FLOATING ROOFS



DOUBLE-DECK SPRINGTITE FLOATING ROOF



LOW SPRINGTITE FLOATING ROOF



HIGH SPRINGTITE FLOATING ROOF

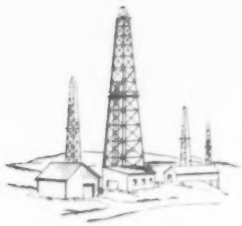
. . . for full details write for Bulletin 51 F.

HAMMOND IRON WORKS

WARREN and BRISTOL, PA. • PROVO, UTAH • CASPER, WYO. • BIRMINGHAM, ALA.

Sales Offices NEW YORK 20 • AKRON • BOSTON 10 • BUFFALO 2 • CHICAGO 3 • CINCINNATI 2 • CLEVELAND 15 • EL PASO • HOUSTON 2 • LOS ANGELES 14 • PITTSBURGH 19 RICHMOND 20 • SAN FRANCISCO • WASHINGTON 6, D.C. • HAVANA • "TIPSA," BUENOS AIRES

ON THE PACIFIC COAST BY **LACY** MFG. CO. • LOS ANGELES, CAL. • IN CANADA BY **VULCAN** IRON & ENG. LTD. • WINNIPEG



LOWERS maintenance cost . . .
INCREASES production efficiency

Kennametal Balls and Seats last over 20 times longer than alloy steels* because of their high resistance to wear and ability to absorb great shock. Diamond-like hardness and great impact strength, which are most inherent in Kennametal sintered carbides, reduce costly string pulling to a minimum and provide steadier day-by-day oil production.

Sintered carbides of Kennametal provide long service life in pumping fluids with sand, water, sour crude, hydrogen sulphide cuts—and are dependable insurance in *any* well against string pulling due to faulty balls and seats.

Kennametal Balls and Seats can give you big savings in string-pulling costs, and higher production rates through more continuous pumping. They are standard equipment in most leading pumps. A complete line of Kennametal sintered carbide balls and seats (in both plain and rib types) is available in API sizes from suppliers everywhere.

**As proved by numerous comparative performance reports from both the West Coast and Mid-Continent Fields. Specific data furnished by writing manufacturer.*

KENNAMETAL

PUTS AN END TO DOWN-THE-HOLE VALVE CHECK TROUBLE

Quality Sintered Carbide API Balls and Seats

®

Manufactured by

Kennametal Inc., Latrobe, Pa.

SOLD BY YOUR REGULAR SUPPLIER

How to get more radio frequencies via Split-Channel Communications... at the lowest possible cost!

All of us readily admit the communications phase of oil industry operations leaves much to be desired. Under present FCC licensing regulations few new radio users can be accepted; those who maintain a system have no opportunity for expanding facilities.

It would seem that the single solution to this problem lies in obtaining additional frequencies via split-channel operation. Split-channel, in effect, doubles available spectrum space. It is today's best panacea for an overcrowded situation.

Split-channel operation and its multiple benefits logically focuses attention on the General Electric Company. G.E. started designing narrow band communication systems nearly ten years ago! As early as 1947 G-E engineers developed the first working equipment models. Then, after intensive research and development, these men gave testimony before the Federal Communications Commission proving the practicality of narrow band systems. G-E units were the first to be installed throughout the country... ready to operate on split channels.

LOW BAND OPERATION (25-50 MC): G-E equipment currently in use and available for the past three years converts to split-channel operation with amazing ease. All that is required is the addition of 2 resistors and three capacitors. Total time for conversion: 1 hour... total cost: approximately $3.00!

HIGH BAND OPERATION (152-174 MC): The day of split-channel communications in this band is fast approaching. It behooves the oil industry to be ready for this necessary changeover. Ready with G-E equipment and its low cost solution to providing future convertibility. Increased selectivity requirements for split-channel operation are already built-in by G.E. in current equipment sold for this band! Just clip out three components and adjust three screws. Other than opening the chassis, turning it over, and performing this operation... no other work is required... no expensive filter or additional equipment necessary! Cost is obviously almost non-existent!

The obsolescence-proof design of your General Electric 2-way communications system clearly results in important dollar savings as well as offering the most versatile performance when frequencies are halved to accommodate more radio users. *No wonder the trend is to G-E!*

General Electric Company, Section 893-28, Electronics Park, Syracuse, N. Y.

Follow the trend... Replace with G-E!

GENERAL ELECTRIC

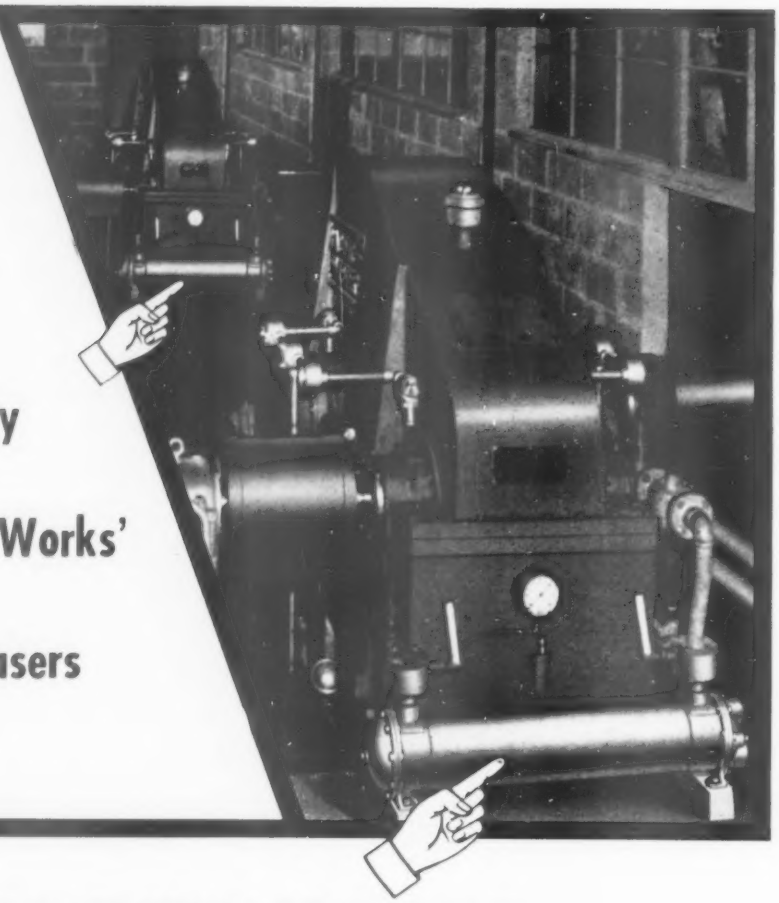
for

continuous

temperature safety

in Western Gear Works'

giant speed increasers



ROSS EXCHANGERS

Quiet dependability under heavy-duty continuous load — in the words of the manufacturer — has built widespread preference for Western Gear Works' high speed gear units.

For continuous temperature safety of gears and bearings, Type C Speed Increasers (shown) — *the largest ever built in the U. S.* — are Ross Exchanger equipped. In fact *all* present Western Gear Works' Speed Increasers are Ross Exchanger equipped. Ample supplies of properly cooled lube oil are thereby provided at all times. Heat generated by power transmission is effectively carried away.

Just as Ross Exchangers are preferred for major equipment serving pipelines, so are they also preferred throughout the oil and gas industry: for engines, compressors, turbines, hydraulic machinery, centrifugal pumps, torque converters and trucks.

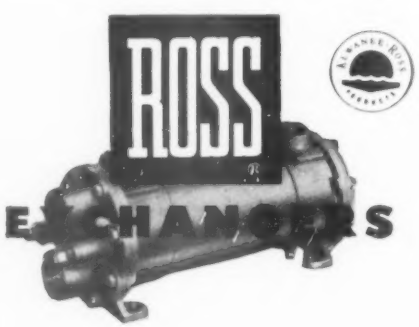
Repeatedly chosen for their rugged dependability, as well as their thermal efficiency, all copper and copper alloy Ross Type BCF Exchangers are completely pre-engineered, fully standardized and *promptly* available to meet most requirements. For complete information, request Bulletin 1.1K5.

KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

1417 WEST AVENUE • BUFFALO 13, N. Y.

In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.



Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Now Open

New Mid-Continent Store
Edmonton, Alberta, Canada

Now the Canadian Oil Industry is being offered Mid-Continent Supply Company's well known "Around the Clock, Around the World" service from a new, completely stocked, completely staffed field supply store at Edmonton, Alberta, Canada. This new store, which is now open and operating, along with our new Canadian Division offices at Calgary, assure the Canadian oil industry of Sure Service — Sure Supply.

MID-CONTINENT
Supply Company
MID-CONTINENT BLDG. FORT WORTH, TEXAS

EDMONTON STORE: SOUTH 104TH STREET
CALGARY OFFICE: 200 BLOW BUILDING

THE WORLD'S LARGEST INDEPENDENT OILFIELD SUPPLY COMPANY

EQUIPMENT IN CUSHING-CHICAGO PUMPING STATIONS

Built to Work Together

Wide Equipment Line Plus Engineering Coordination Helps Sinclair Simplify Job!

ALLIS-CHALMERS PROVIDES a wide range of both electrical and mechanical equipment — and experience.

This enabled Sinclair engineers to turn over many details on its seven pipeline pumping stations to Allis-Chalmers.

For example, Allis-Chalmers furnished complete substations — everything — including steel structures, unit substations, on down to the valve operator control.

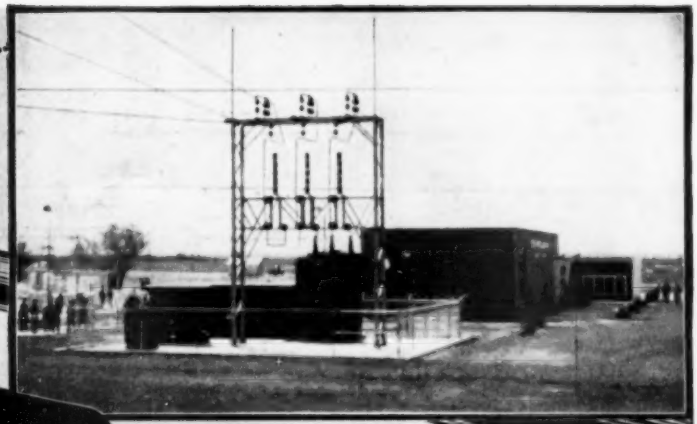
Allis-Chalmers also furnished the four mainline pump motors used in each station. Here a great deal of coordination was required between motor and switchgear designers in setting up proper protective circuits in the switchgear for the motors.

Get Complete Information

Call your nearby Allis-Chalmers district office for equipment help covering a wide range of products. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4120

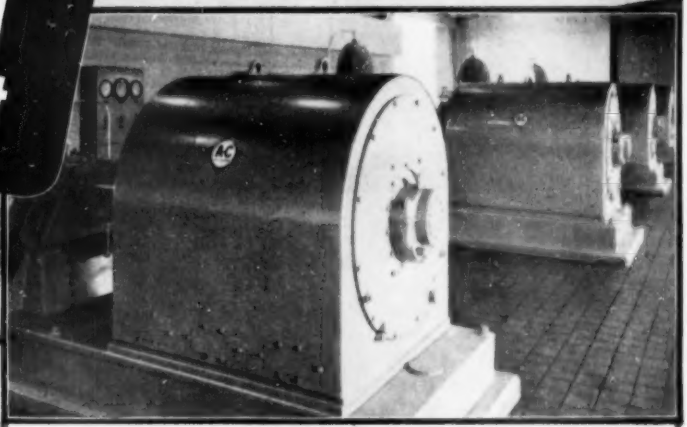
New $52,000,000 Cushing-Chicago pipeline is last word in simple, safe operation.



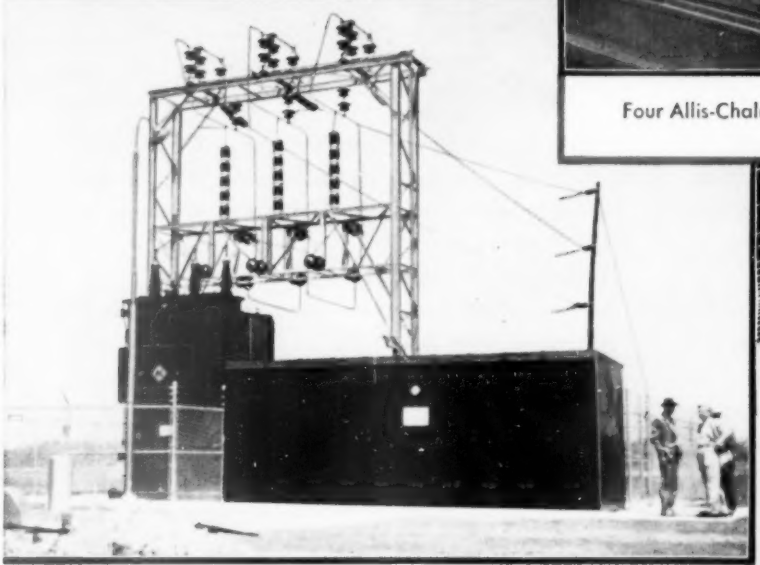
Cushing station in Cushing, Oklahoma.

ALLIS-CHALMERS

Combined Equipment



Four Allis-Chalmers mainline pump motors for new pipeline.



One of five Allis-Chalmers unit substations along the line.

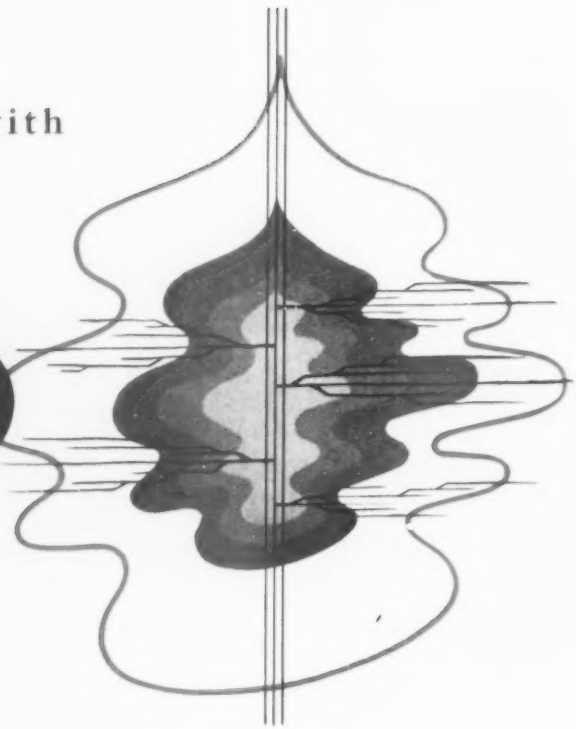
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

INCREASE PAY ZONE PERMEABILITY with

HALLIBURTON'S

MCA



Plugged up wells are being revived by a remarkable chemical called MCA. This Mud Cleanout Agent actually removes aqueous and bentonitic blocking materials from sand and limestone formations... actually increases permeability of the pay zone.

MCA, a unique compound of Halliburton's Morflo and hydrochloric acid, has a double punch that enables it to break water blocks, water-oil emulsions, and reduce water-swollen bentonite particles in the vicinity of the well bore.

Bentonitic materials, once a serious threat to free fluid flow, shrink before this exclusive Halliburton compound. Hydrogen from the hydrochloric acid replaces sodium on the bentonite. And MCA does not allow the bentonite particles to rehydrate even when the formation is filled with fresh water.

Results from MCA treatments have been highly encouraging. Now wells that might have been abandoned, and old pumping wells have been changed into economic producers. And many operators find that these treatments also are beneficial when used prior to squeeze cementing jobs.

Trained Halliburton specialists, with the big background of more than a million oil well service jobs, can assist you in determining when and where this effective compound can increase permeability in your pay zone. Just call your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES!

Bitumastic Enamel being machine-applied to a section of "The Biggest Inch."

NOW— deep in the ground of Texas "The Biggest Inch"

TEXAS does things in a big way... and the 465-mile pipe line that was recently completed is a good example. Called "The Biggest Inch" by the builders, West Texas Gulf Pipe Line Company, this steel line is the largest single carrier of crude oil in the United States.

It starts about 12 miles from Colorado City, Texas, and terminates near Port Arthur. A river of oil rolls through this 26-inch line at the rate of 301,000 barrels daily. Eventually, it is expected that 440,000 barrels of oil will be pumped through this giant artery each day—an amount which otherwise would require approximately 2,000 tank cars.

Such an important pipe line deserves the best possible protection against corrosion. And it has it! Exterior surfaces were coated with Bitumastic® Enamel—a protective coating that has *proved* its worth. Many oil and gas pipe lines, protected by Bitumastic Enamel 20 and 30 years ago, are still in excellent condition today.

Specify Bitumastic Enamel for your next pipe-line project, and give it *lasting* protection against corrosion. For complete details and estimates, get in touch with one of our representatives.

KOPPERS BITUMASTIC® ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 903T, Pittsburgh 19, Pennsylvania

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

At this very moment, hovering over your plant, fire is ready to swoop down on storage spaces, electrical generating equipment, record vaults.

But like a bird of prey, it casts a warning shadow... IF you have a KIDDE Industrial Smoke Detector.

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Walter Kidde & Company, Inc.

954 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

★CONFIDENCE

THE CONFIDENCE which various segments of the Petroleum Industry have expressed in Shand & Jurs since the recent announcement of our new VARIOPLEX SYSTEM of remote tank gaging, has made us feel doubly conscious of our RESPONSIBILITY to that great industry.

Petroleum Refiners and Pipe Line operators, large and small, have given us orders for from 5 to 70 units, recognizing that the principle of transmitting intelligence by electrical impulses as in the dial telephone or electric typewriter, backed by a long and successful experience in automatic tank gaging, assures accurate and dependable equipment.

Having pioneered Automatic Tank Gaging nearly 30 years ago, and having maintained a position of leadership in that field throughout the years, we are today deeply appreciative of the instantaneous response to our introduction of VARIOPLEX. That response has been expressed in orders, and not in idle curiosity.

If you are interested in gaging tanks located at any distance from a central control office, and getting accurate measurements in just 25 seconds per tank, write for a copy of our VARIOPLEX CATALOG No. VG-353. You, too, will exclaim—"This is just what the doctor ordered."

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NEW BEAUTY IN ALUMINUM INDUSTRIAL SIDING

Installed by MacArthur Company, one of Reynolds approved jobber-erectors for the Austin Company, General Contractors. See below.*

When the Cochran Foil Company, Louisville, Ky., wanted siding as outstanding in appearance as in performance, the specification was obvious...Reynolds Ribbed Embossed Siding. Here is rustproof, corrosion-resistant aluminum *plus* modern architectural design. Applied cost is low. Maintenance cost is practically nil. Aluminum's heat-reflectivity cuts the cooling cost of the building in summer, cuts fuel cost in winter. Light-reflective inner surface is a well-known extra advantage. For cost-cutting efficiency, specify aluminum. For efficiency *plus new* beauty, make it Reynolds Ribbed Embossed Siding.

***Comprehensive material and installation service on Reynolds Industrial Building Products now available through an approved jobber-erector system. For literature and technical data, call the nearest Reynolds office listed under "Building Materials" in classified phone books of principal cities. Or write to: Reynolds Metals Company, Building Products Division, 2023 South Ninth St., Louisville 1, Kentucky.**

DESCRIPTION:

METAL THICKNESS: .032" (22 U.S. Std. Ga.).

FINISH: Stipple-embossed.

LENGTHS: 5', 5½', 6', 6½' and so on to 13½'; also 13'10". Special lengths to order.

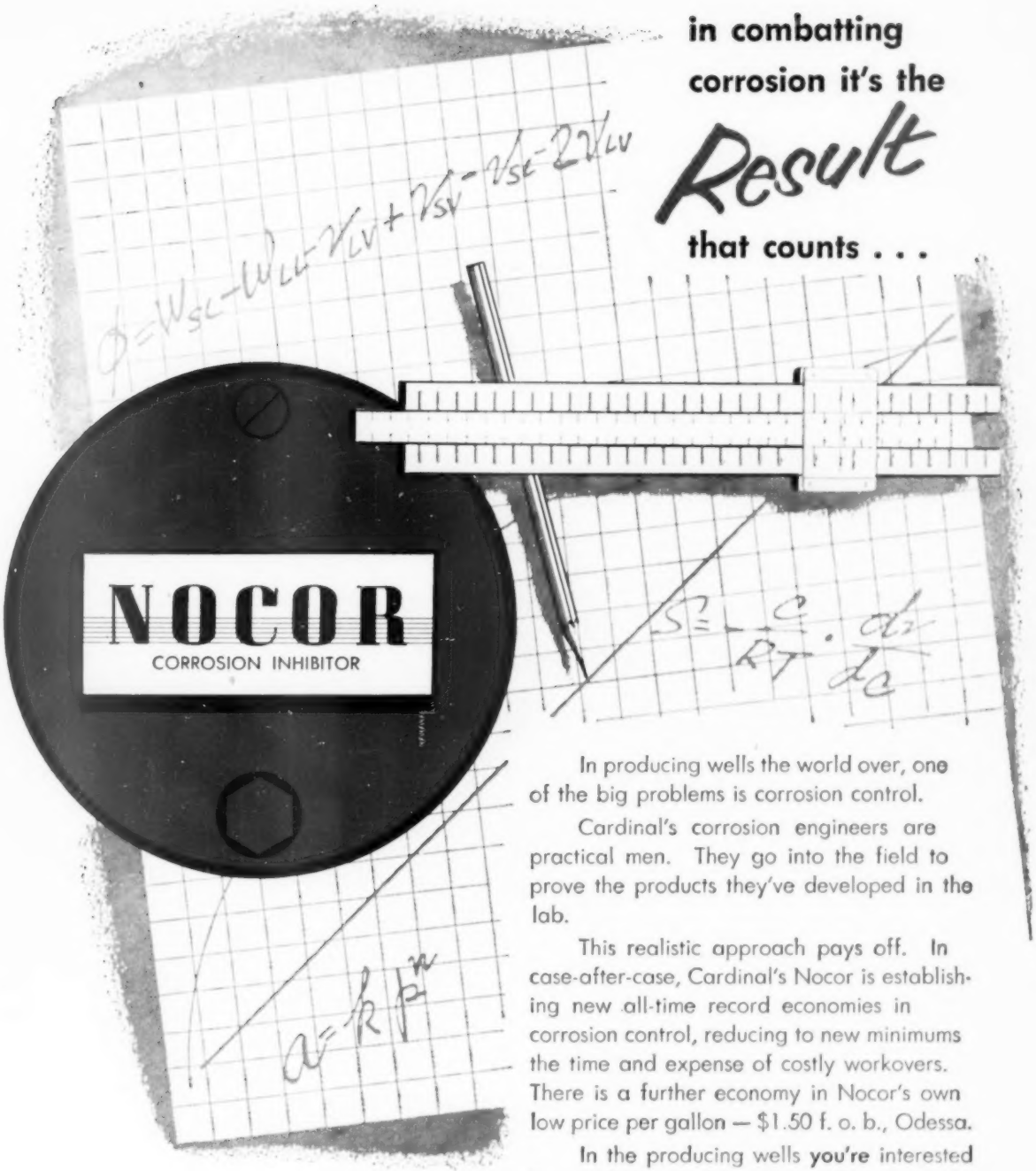
WIDTH: Over-all width 33⅜", nominal coverage 32".

RIBS: Pitch 4" center to center, depth 1".

WEIGHT: 59 lbs. per 100 square feet.

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC-TV Network.

REYNOLDS *Lifetime* ALUMINUM RIBBED EMBOSSED SIDING



in combatting corrosion it's the

Result

that counts . . .

In producing wells the world over, one of the big problems is corrosion control.

Cardinal's corrosion engineers are practical men. They go into the field to prove the products they've developed in the lab.

This realistic approach pays off. In case-after-case, Cardinal's Nocor is establishing new all-time record economies in corrosion control, reducing to new minimums the time and expense of costly workovers. There is a further economy in Nocor's own low price per gallon — $1.50 f. o. b., Odessa.

In the producing wells **you're** interested in, get the result that counts. Get Nocor "102".

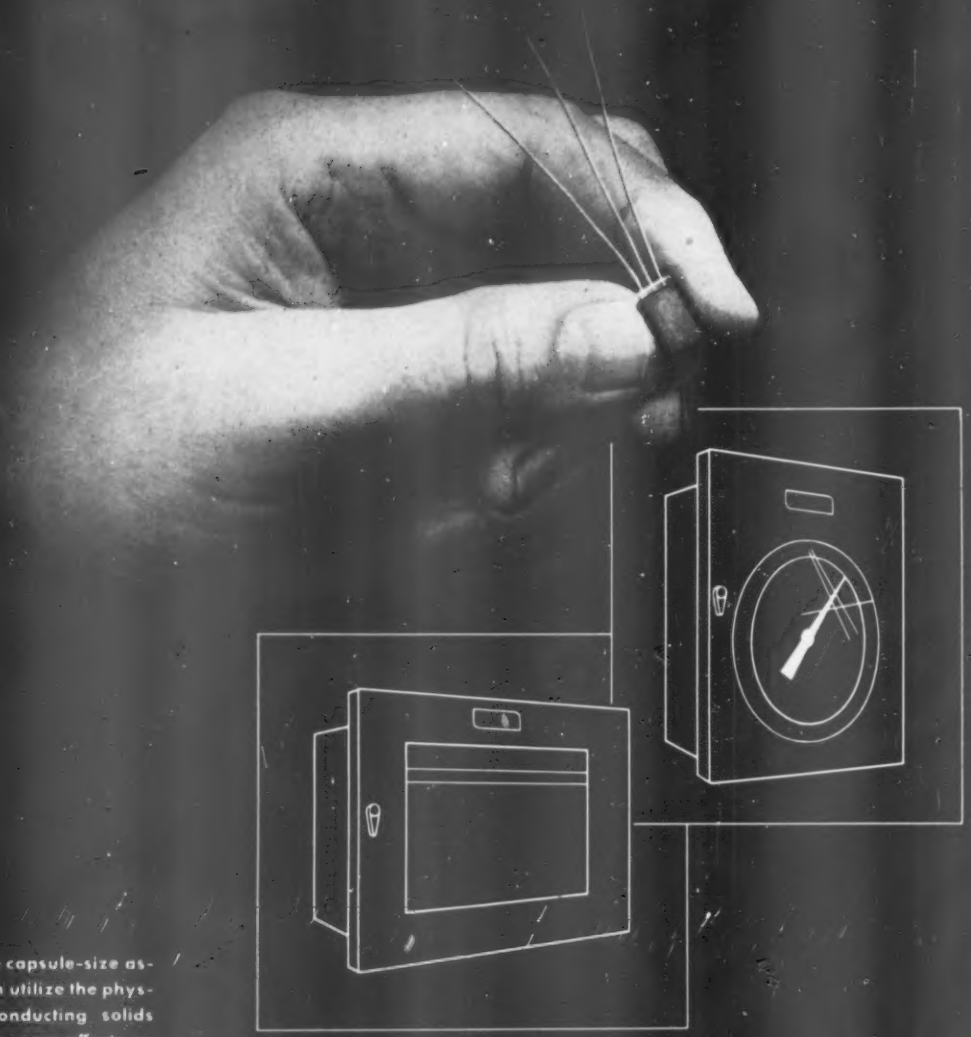
WRITE FOR ILLUSTRATED BULLETIN

CARDINAL CHEMICAL · INC.

HOME OFFICE ● ODESSA, TEXAS ● BOX 2049

Transistors*

in instrumentation...



*Transistors are capsule-size assemblies which utilize the physics of semi-conducting solids to produce the same effects as an electronic tube . . . but without cathode and/or filament and their circuitry components.

When ?

A timely statement from Walter P. Wills,
Director of Research, Brown Instruments Division
Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa.

"PERHAPS you've wondered when transistors, with their widely publicized characteristics, will be put to work in industrial instrumentation. Naturally, I can speak only for my company, but I'd like to give you a research man's view on where transistors stand today.

"We agree that transistors have a tremendous future in all of electronics, including automatic control. Many problems, however, must yet be solved. Will they be made of germanium or silicon? Can they be made more reproducible and able to handle enough power at desired voltages? New circuits and new transistor types are needed. Today's costs are much too high. And let's not forget that the vacuum tube is still being developed after more than 40 years of existence.

"Even with extensive research and development programs, much more work remains before transistors can be broadly utilized in their natural markets—radio, television, and other communication equipment. Similarly, the few types now available do not nearly satisfy the requirements of industrial instrumentation.

"A 'tubeless' electronic instrument is theoretically possible today, and, on the basis of safety and reliability expected of modern instruments, it is anticipated that such a product is completely possible and practical in the future.

"So we're attacking the problem on a broad front. For upwards of five years, we've been devoting a large portion of our research facilities to studying ways to utilize transistors . . . looking on them not solely as replacements for tubes, but as the starting point for totally new instrument circuits.

"In addition, we have invested in the patent licenses and the know-how of Bell Telephone Laboratories, the pioneer of transistors. We have a large stake in providing instrumentation for the manufacture of transistors and hence are examining all facets of the transistor business . . . even to the extent of making some with our own hands.

"Honeywell instruments and other Honeywell controls using transistors will be on the market. When they are, you can be sure they will be great products—new, but the same kind of reliable, versatile, well-engineered products we sell today."

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

COOPER — ALLIS-CHALMERS
Model E-563 with Choice of Clutches

Cooper—Allis-Chalmers
Model E-563
2 Drum Spudder tailing-in
a 3,500 ft. well.

Cooper—Allis-Chalmers Model E-563 Rod and Tubing Servicing Winch Units and Double Pitman two or three drum tailing-in Spudder Units.

Air Friction Drum Clutches

or

New Ball Bearing Positive Dental Drum Clutches that shift without chain misalignment

Whichever you choose, you get all of these outstanding features in the Cooper—Allis-Chalmers Model E-563

1. Chains run in line at all times.
2. Ball and roller bearings throughout.
3. Big 42" Dia. x 8" wide brakes for depths to 6000'.
   36" Dia x 6" wide brakes for depths to 5000'.
4. Patented Air Cooled Brakes with demountable rims.
5. Allis-Chalmers Engine built especially for stationary work with Wet Cylinder Liners—valves in head—forced feed lubrication—ample cooling capacity.
6. Quick Drop Two Pitman Spudder with tool travel of 22", 28" or 36"—proper tool action for the fastest possible drilling.
7. Two-pole Telescoping Masts that are raised and telescoped with a single line.

Available equipment—Air Compressors, Catheads, Rotary Drive, Drum Dividers, Cat Line Roller Guides, and Line Guide Shells.

A Cooper Sales Engineer will be glad to furnish more detailed information on this outstaading rig

It will pay you to get facts and prices on Cooper equipment before buying. There is a size and type for any depth or field condition.

FRED E. Cooper, Inc.

P. O. Box 1890 TULSA, OKLA.

Houston, Odessa, Los Angeles

They Say—

Wooden Derricks Are Menace

"Long Beach's campaign to get rid of unsightly and dangerous wooden oil derricks should take new inspiration and hope from a dispatch from Bakersfield.

"The dispatch announced that an oil company in the pioneer Kern River field has felled the last of 866 wooden derricks which once stood on the company's holding there.

"Long Beach and Signal Hill still have scores of these menacing towers of wood. And they are disappearing much too slowly.

"Many of these derricks have been standing since the 1920's or longer. Investigation has shown that many are rotten and termite-eaten.

"Some derrick owners deserve praise for the way they have cooperated with officials in eliminating hazardous derricks. Others have shown disappointing reluctance."

An editorial in the Long Beach (Calif.) Press-Telegram.

Stiffer Conservation Needed

"We are now embarking, we hope, on a new era of peace in which we must review and stiffen our conservation practices.

"We are now entering an era in which, rather than carry on all-out war production, we must conserve our oil and gas on a peacetime basis. We must look to the future, rather than to our immediate needs."

Gov. Edward F. Arn of Kansas, chairman of the Interstate Oil Compact Commission, speaking before the commission at its fall meeting, Billings, Mont.

Industry Must Help Medical Schools

". . . at a time when the country is calling for more doctors and industry for more researchers and medical directors, the schools are finding it difficult to keep from falling behind—not only in the number of graduates, but in the quality of training.

"Our industry has a special interest in the promotion of health and in a continuing supply of competent physicians, medical scientists, researchers, and other professional personnel.

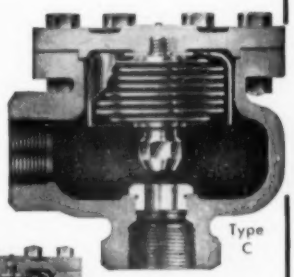
"Many corporations contribute regularly to local causes. But no local hospital or health agency could function for one day without the doctors and

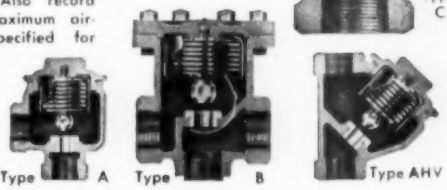
LEADING PROCESSOR

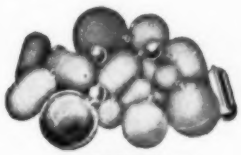
SHORTENS OPERATION from 65 to 45 Min.

with Nicholson Steam Traps

Records of a recent installation of Nicholson steam traps, by a large processor, show they cut heating cycles 30%; e.g., one operation was shortened from 65 to 45 min. Nicholson units keep equipment full of live steam because: 1) they operate on lowest temperature differential; 2) have 2 to 6 times average drainage capacity. Also record low for steam waste; and maximum air-venting capacity. Widely specified for preventing damage to thin gauges; eliminate cold blow in unit heaters.







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WILKES-BARRE, PA.

5 TYPES FOR EVERY PURPOSE—Size ¼" to 2"; pressures to 250 lbs. **BULLETIN 853.**

HIGH-PRESSURE FLOATS—Stainless, monel, steel or plated steel. Welded. In all sizes and shapes; for operating mechanisms and as tanks or vessels. **BULLETIN 753.**

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

Non-Ferrous

WELDING DESIGN and FABRICATION

- Monel Metal
- Stainless Steel
- Glass-lined Tanks
- Aluminum-clad Metals
- Cadmium-lined & Galvanized Vessels

Experience in meeting the exacting requirements of our military contracts is a guarantee to customers of our ability to meet highest standards in all types of non-ferrous and special alloy fabrication. Heliarc and "Sigma" semi-automatic inert gas welding for the latter mean special qualifications to meet the most exacting requirements.

WARNER LEWIS COMPANY

BOX 3096 • TULSA, OKLAHOMA

The tougher they come...
To set large nuts up tight. To loosen frozen nuts. For working in close quarters. Where you need a combination of strength and leverage — use a Williams box pattern "Superrench".
These wrenches are designed for on-the-job efficiency. They are extra strong . . . drop-forged from selected alloy steel and heat treated. You'll get plenty of long time service from every "Superrench" in your set.
Regular and Heavy Duty 12-Point Box — Thin head walls permit efficient operation in close quarters. Opening of 7/8". Rotates hex nuts where wrench can be swung only 15°. Handles can be bent above head at angles of 45° and 90°.
Structural Box — Long, sturdy, tapered handle easily inserted for lining up bolt holes. Ample strength and leverage. Can be supplied with heads bent up to 90° left or right of handle.
Striking Face Box — Grip nuts on six sides without slipping. Heads, approximately same thickness as nuts, are extra strong . . . give full bearing in severe service. Used for heavy work in close quarters. Available in straight and offset patterns.
Chain Pipe Tongs — The new "Vulcan" Reversible, which will turn pipe in either direction without removing tongs or loosening chain, heads up four styles with capacities ranging from 1/8" to 18". Used for both pipe and fittings 1/4" to 8". For fittings, simply remove outer jaws.
• Catalog 301 illustrates and details the complete line of Williams tools. From this catalog, you can select the right tools for your work. Write for your copy today.
Be Wise... Buy
WILLIAMS
TOOLS
THROUGH YOUR SUPPLY STORE
J. H. WILLIAMS & CO. 567 Vulcan Street, Buffalo, N. Y.
FOR THE FINEST IN DROP-FORGED TOOLS AND DROP-FORGINGS

medical personnel trained by the medical schools.

"There is a further issue: private versus government support. If industry lets the schools down, they will have no choice but to rely exclusively on federal subsidies, described by President Eisenhower as 'perilous alternative' to private support."

A press statement issued by B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., and chairman of the Petroleum Committee, National Fund for Medical Education, New York.

Cartels, Regulations Hurting Europe

". . . in conversations with European businessmen, I detected . . . a resistance to the idea that competition in sale of products might stimulate and improve their businesses.

"This type of thinking, combined with government regulations and the operation of the various cartels, places severe limitations upon individual action and initiative and makes it virtually impossible for an enterprising man to find an opportunity to set up his own marketing operation.

"I know that if you would ask the average American oil man if he would like to see our industry modeled after the general pattern of business in Europe, he would answer with an emphatic no, yet . . . I have noticed a number of them running to the federal, state or local government and asking for laws or regulations as a solution to specific problems.

"It would seem that although they would find it repugnant to be subjected to a collectivist government's book of regulations, they see no objection to borrowing a page from the book."

Willard W. Wright, general sales manager for Sun Oil Co., addressing the fall convention of the Michigan Petroleum Association, Mackinac Island, Mich.

Aussies Rekindle 3-Mile Limit Dispute

"The American controversy over offshore oil appears now to be having its counterpart in Australia. The Australian House of Representatives has just passed a bill proclaiming Australia's sovereignty over all waters on the Continental Shelf, which extends out 200 miles in some places.

"The measure is a result of differences of opinion between Australia and Japan over pearl shell rights.

"The Australians maintain there is precedent for their action in the United States measure granting the federal Government rights in the Continental Shelf. However, the Australian meas-

FIRST IN LEADERSHIP FEATURES

The worldwide demand for Walker-Neer Spudders continues to grow. During recent months, Walker-Neer has shipped new spudders to Arabia, Israel, Italian Somaliland, Alaska, Mexico, Canada, and Portugal, as well as to many parts of the United States.

We invite you to write for literature which explains the "leadership features" behind this ever-growing demand—features that provide the quietest, smoothest spudding action in the field . . . faster, harder-hitting strokes . . . trouble-free spooling . . . savings in power and parts wear . . . easy replacement of parts . . . and outstanding versatility. There is a Walker-Neer Spudder for every need, varying from 1000 feet to 10,000 feet in top-to-bottom drilling capacity, and up to 14,000 feet in workover capacity.

WALKER-NEER

MANUFACTURING COMPANY, INC.

P. O. BOX 2490 WICHITA FALLS, TEXAS

DISTRIBUTORS: Oil Well Supply Company • Bovaird Supply Company • Jones & Laughlin Supply Company
Mountain Iron & Supply Company • Acme Well Supply (exclusive export agent except on North American Continent)

an ACCO product

Why You Can Expect Longer, Trouble-Free Service

• The choice of metals used in the R-P&C Rising Stem Bronze Gate has a lot to do with its fine service record. The body is cast of high test bronze in our own foundry, the stem is high tensile rolled bronze, while the solid wedge and seat rings are nickel-alloy.

The design is important, too. The union bonnet adds strength and won't distort the valve body or threads when it is removed. Fluids don't come directly in contact with the operating threads and the rising stem shows position of the wedge. It's easy to disassemble this valve where frequent cleaning is necessary.

The **No. 716** R-P&C Bronze Gate Valve is made in sizes ¼" to 3", for 200 lbs. steam pressure at 500° F; or 400 lbs. OWG, non-shock. It is economical to buy and use.

• See your R-P&C distributor or write our Reading, Pa., office for literature

ACCO

TRADE MARK

R-P&C VALVE DIVISION
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Baltimore, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

R-P&C valves

ure is described as extending Australian sovereignty over waters beyond the traditional 3-mile limit. The American measure was concerned with establishing rights to resources beneath these waters.

"The idea of the 3-mile limit dates back to the eighteenth century when the distance of a cannon shot was considered as defining territorial limits. The experts themselves differ over whether this is actually an established international law or whether it is merely a generally accepted practice. At any rate, there has been a good deal of dissatisfaction with the concept at a time when greater speeds and modern developments make the eighteenth century limit too confining.

"An international conference called back in 1930 broke up without ever producing a clear-cut statement on the extent of territorial waters. With the concept of a 3-mile limit now again under direct challenge, perhaps a new attempt should be made to get a modern clarification of the limits of national sovereignty."

Editorial in the Des Moines Register.

CALENDAR OF EVENTS

SEPTEMBER

27-30 American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.

Sept. 27-Oct. 2 American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C.

28-30 American Society of Mechanical Engineers, Petroleum Division, annual conference, Rice Hotel, Houston.

28-29 Independent Natural Gas Association of America, Shamrock Hotel, Houston.

Sept. 30-Oct. 2. American Association of Petroleum Geologists, Mid-Continent regional meeting, Masonic Building, Wichita.

Sept. 30-Oct. 2 National Association of Corrosion Engineers, Permian Basin section, biannual field tour, Lincoln Hotel, Odessa, Tex.

OCTOBER

1- 2 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.

4- 6 American Association of Oilwell Drilling Contractors, thirteenth annual meeting, Cosmopolitan Hotel, Denver.

5- , Petroleum Electric Power Association, silver anniversary meeting, Muehlbach Hotel, Kansas City.

6- 7 Texas Mid-Continent Oil and Gas Association Rice Hotel, Houston.

7- 9 National Association of Corrosion Engineers, south central region, Mayo Hotel, Tulsa.

...dollar per dollar

b.t.u. per b.t.u..... .....

PETROCHEM-ISOFLOW FURNACES

are most efficient by any comparison!

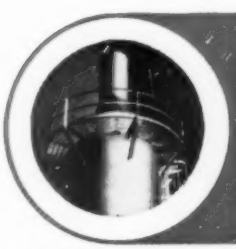
BETTER HEAT DISTRIBUTION
MAXIMUM FUEL EFFICIENCY
LOW PRESSURE DROP
LOW MAINTENANCE
ZERO AIR LEAKAGE
EXPLOSION RESISTANT
MINIMUM GROUND SPACE
SHORT LENGTH OF LIQUID TRAVEL
EXCESS DRAFT FOR HIGH OVERLOAD
PLENUM CHAMBERS FOR HAZARDOUS AREAS

simplicity of design and construction

The Isoflow Heater basically is a circular steel shell; this results in an explosion-resistant structure. The shell is lined on the inside with insulation and insulating refractories; this results in a wall with a zero air leakage and high efficiency. The vertical tubes are combined with integral convection tubes; this results in less headers in the heaters for complete cleanability. The integral radiant convection tubes and minimum number of headers result in a minimum pressure drop for a given velocity. The vertical tube completely shield the walls resulting in low wall maintenance. The small number of headers in combination with the vertical tubes result in ease of cleaning and, if desirable, gang-cleaning of several tubes simultaneously. Individual burners, symmetrically spaced with relationship to the tubes, results in even heat distribution horizontally. The reradiant cone effects even heat distribution vertically. Segregated burners result in ease of firing and inspection of burners. These are some of the design features which place Isoflow Furnaces in a class of their own

—most efficient by any comparison.

More than 1150 are in operation throughout the world in the petroleum, chemical and allied industries . . . for all processes and for any duty, pressure, temperature and efficiency . . . and all Petrochem-Isoflow Furnaces are pre-eminently satisfactory.



PETROCHEM-ISOFLOW FURNACES

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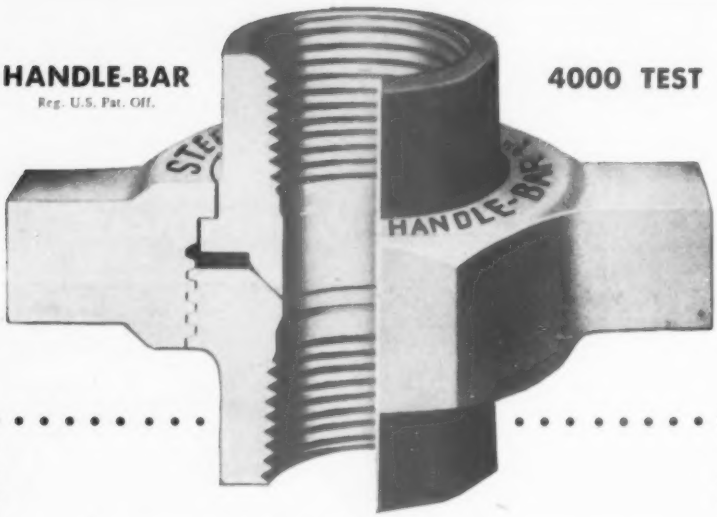

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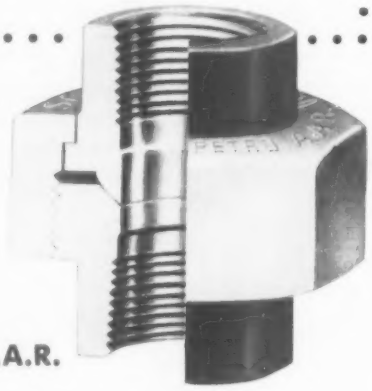

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11-17	Oil Progress Week.
12-16	Short course on cathodic protection, University of Illinois, Urbana.
16-18	New Mexico Geological Society, fourth annual field conference, El Paso, Tex.
19-21	American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Dallas.
19-20	Independent Petroleum Association of America, annual meeting, Texas Hotel, Fort Worth.
19-23	National Safety Congress, annual meeting, Hotels Conrad Hilton, Congress, Harrison, and Sheraton, Chicago.
21-23	Gulf Coast Association of Geological Societies, third annual convention, Captain Shreve Hotel, Shreveport.
22	American Institute of Chemical Engineers, New York section, symposium, Hotel New Yorker, New York.
22-23	Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
23	Natural Gasoline Association of America, regional meeting, Blackstone Hotel, Tyler, Tex.
26-28	National Lubricating Grease Institute, Edgewater Beach Hotel, Chicago.
26-29	American Gas Association, annual conference, Kiel Auditorium, St. Louis.
27	Institute of Gas Technology, annual meeting, Chase Hotel, St. Louis.
27	Association of Consulting Chemists and Chemical Engineers, Inc., annual meeting, Hotel Belmont Plaza, New York City.
28-30	Seventeenth Technical Conference on Petroleum Production, Mineral Industries Building, Pennsylvania State College, State College, Pa.
29-31	Rocky Mountain Oil and Gas Association, annual convention, Cosmopolitan Hotel, Denver.

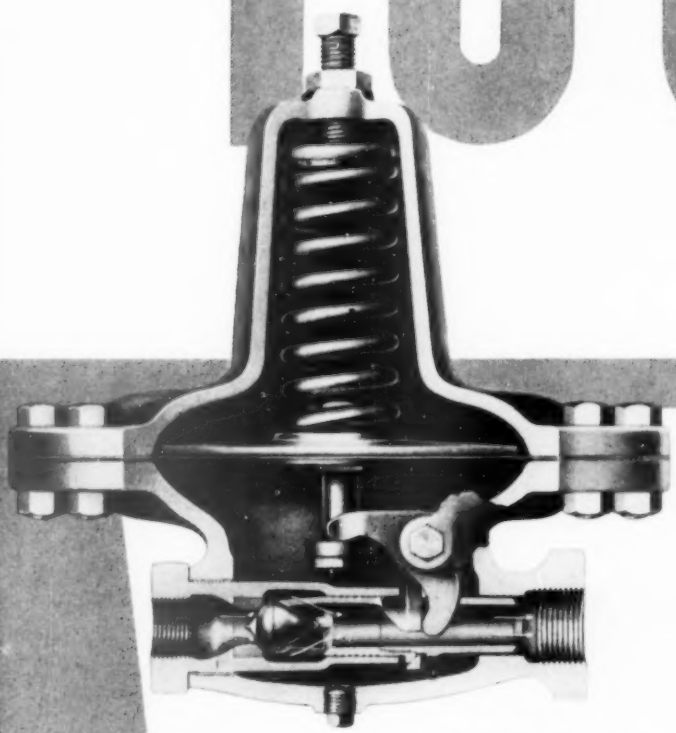
NOVEMBER

3- 4	Society of Automotive Engineers, national diesel-engine meeting, Conrad Hilton Hotel, Chicago.
5- 6	Society of Automotive Engineers, national fuels and lubricants meeting, Conrad Hilton Hotel, Chicago.
5- 6	American Association of Petroleum Geologists, Pacific section annual meeting, Hotel Biltmore, Los Angeles.
9-11	Geological Society of America, annual meeting, Royal York Hotel, Toronto, Ont.
9-12	American Petroleum Institute, annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
12-13	Society of Exploration Geophysicists, midwestern meeting, Adolphus Hotel, Dallas.
19-20	National Association of Corrosion Engineers, western region, fall conference, Biltmore Hotel, Los Angeles.
19-20	Annual Instrument Short Course, Los Angeles Harbor Junior College, applied technology division, Wilmington, Calif.
20	Natural Gasoline Association of America, regional meeting, Herring Hotel, Amarillo, Tex.
Nov. 29-Dec. 2	American Society of Mechanical Engineers, Statler Hotel, New York City.

DECEMBER

1- 4	Corrosion conference, University of Oklahoma, Norman.
13-16	American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

TYPE 1000 VALVE



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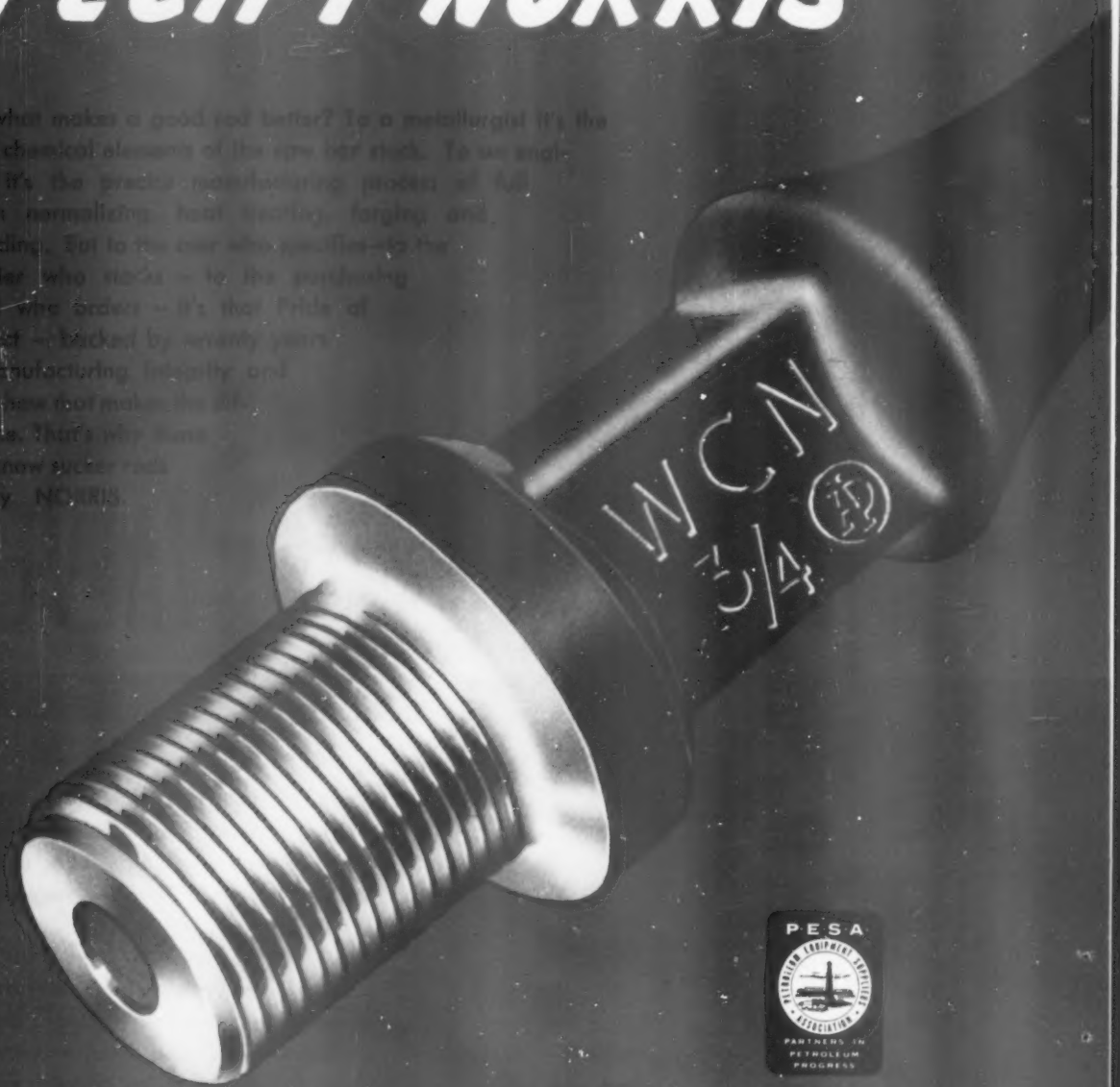

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Phone 3-6291. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

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Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1953 by The Petroleum Publishing Co.

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JOURNALLY Speaking

Galloping Swede

MONTANA oil is having its troubles these days, what with lack of pipe-line outlets, a new conservation commission just getting set up, and various troublesome political situations, but at least the state has a governor who knows oil men. He talks oil man's language, too — the field man's language with a trace of Old Country accent.

Gov. J. Hugo Aronson is known throughout the state as "The Galloping Swede," a sobriquet he acquired years ago as a fast-moving oil-field hauler and rig builder. He liked it so well he adopted it as his trade mark and had it painted on all his trucks. Last year when he decided to run for governor some of his diffident silk-stocking political advisers looked askance at this rather undignified appellation, but with characteristic forthrightness he blustered:

"Hell, that's the name that made me my reputation and my money, and to my dying day I'll be known as the Galloping Swede no matter what I do. That's going to be my campaign slogan."

It was, and he galloped into the governor's chair.

If Governor Aronson's political methods are like his oil-field methods, Montana is in for an interesting time. He is universally credited with being the first man ever to skid a drilling rig. It was back in the days of the old nailed wooden derricks and the Galloping Swede was impatient with the time required to tear down a rig and put it up again at the next location, so he simply put skids under the sills, hooked on, and dragged it there. Years later he was challenged to move a big modern steel derrick over some mighty rough country, and everyone predicted that it would tip over on the hills. But he figured that the weight of the draw works would keep it from tipping over no matter how much it leaned, and he was right.

The governor also claims to be the original hero of a legend that has become almost apocryphal in the oil industry and is attributed to a dozen different localities. He says it actually happened to him in Montana years go.

He was hired to build a rig in an almost inaccessible location staked by a doodlebugger, but his trucks got stuck half a mile from the spot so he ordered his crew to build the rig right there. The well was a gusher. Later the intended location was drilled and it was dry as dust. It was a badly faulted field, explains Aronson.

But the story he likes best as an illustration of his aggressiveness and direct methods is about the time he caught one of his men soldiering on the job halfway up a derrick.

"Come on down and get your pay," yelled the Galloping Swede, and then added, "Never mind, I haven't got time to wait. I'll bring it up to you." And he did.

Two for One

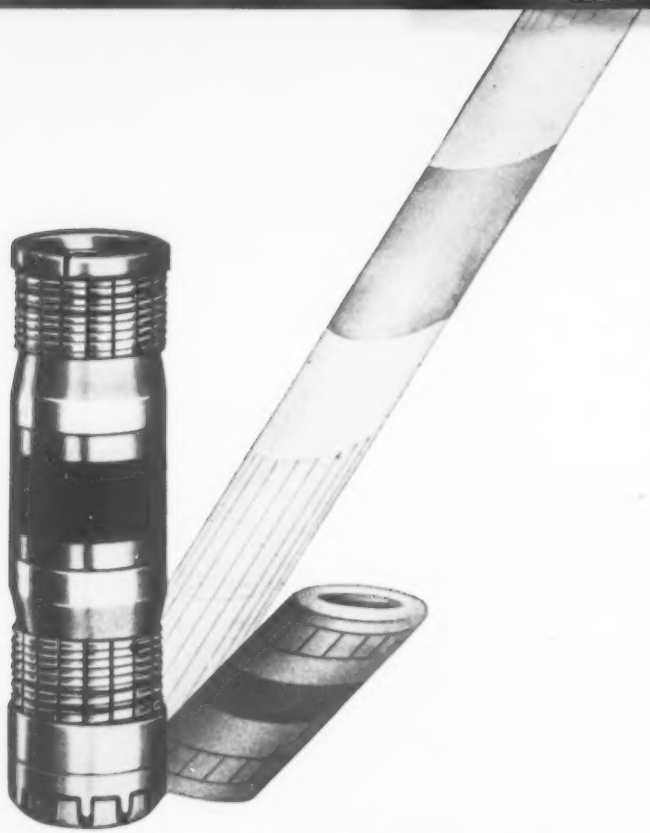
ALREADY we are beginning to get complaints about that map we gave every subscriber in our annual Pipe Line Issue last week.

It's a swell map, they say, nice and big, easy to read, looks fine on the wall, and shows all the pipe lines in the United States and Canada. But, they ask, why did you print the gas lines on one side and the oil lines on the other? We have to keep turning it over to see what we want.

Brother, you can't please everybody. If we put oil and gas pipe lines all on one map it would be such a jumbled mess that nobody could trace a given line in a good many areas.

For years it was our practice to issue a pipe-line map every year, alternating between gas and oil lines. Everyone thought he was getting a bargain, and there were no complaints. This year you get two maps on one sheet and you can take your choice which side you are going to face to the wall. What's wrong with that? Besides, if you just have to use both maps all the time, we'll sell you a second copy.

—*Henry D. Ralph.*



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Five men can create chaos for producers

FIVE men stand between the oil industry and chaos. These are five justices who constitute a majority of the Supreme Court of the United States. Sometime during the next few months the court will pass on two Circuit Court decisions which give the Federal Power Commission virtually complete control over natural-gas production and the natural-gasoline industry.

The word "chaos" is used advisedly and not as a tub-thumping exaggeration for a minor extension of federal regulation. The kind of control which these two Circuit Courts say the FPC should exercise would upset the entire financing and operating practices of the exploration and producing divisions of the oil and gas industry.

Every well producing gas and every processing unit, including a lease separator, would be treated as a public utility. State conservation programs would be shunted aside.

IN the case of Phillips Petroleum Co. one court simply assumed, without argument, that gas production and field treating are part of the utility business. In the case of Northern Natural Gas Co. and the Kansas Corporation Commission, another court said that the FPC can disregard state conservation statutes, and said so in language implying that all independent operators are subject to federal control.

Industry lawyers have written thousands of legal words to demonstrate that these decisions are contrary to the intent of Congress, ignore the language of the law, and totally disregard the facts of the gas industry and the practical effects of the rulings.

Oil operators themselves, by and large, may not be fully aware of the magnitude of the horrendous threat which faces them.

THESE two decisions are but the latest in a series of ambiguous, confusing, and inaccurate court interpretations of the Natural Gas Act, described by one attorney as "judicial obfuscation which has brought the independent producer to the brink of disaster."

It is possible—barely possible—that a majority of the Supreme Court will clear away the accumulated tangle of legal underbrush, get straight to the heart of the problem, and deliver an unmistakable and workable interpretation of the law as it was written.

If not, the only recourse is to ask Congress for another law restating its original intent of 1938. But that may not be as easy as many oil men assume, for today there are men in Congress who have the deliberate intent of placing the oil and gas industry under federal control in the mistaken notion that this will give cheaper products to their constituents.

Unless five men on the high bench find a solution, the industry will face the fight of its life.

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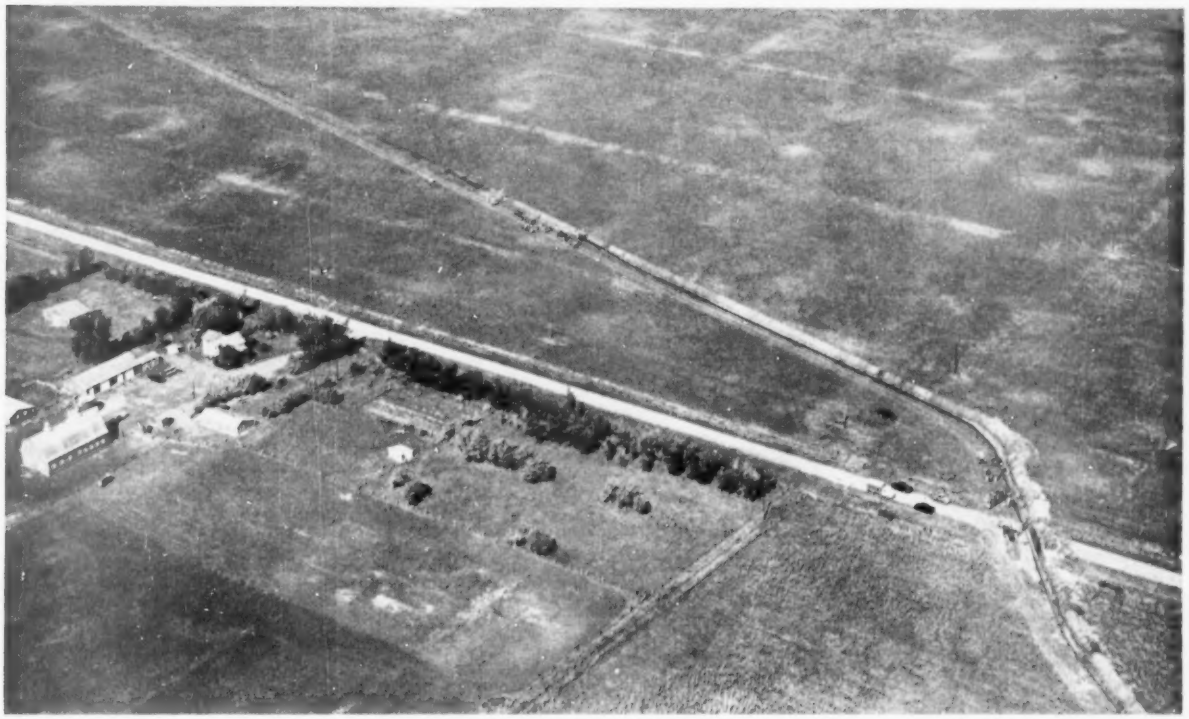
THIS WEEK



NEARLY FINISHED as this picture was taken was the Mandan, N. D., to Moorhead, Minn., products line being laid for Standard Oil Co. (Ind.). Here the line is shown crossing a road 1½ miles south of West Fargo. In the background, backfilling operations are under way. The line will be used in the near future to move products from the Moorhead terminal into the Bismarck area. Later, when the Indiana Standard 30,000-bbl. refinery at Mandan is completed, the products flow will be reversed.

INTERNATIONAL.—Venezuela's 4,500 oil workers get 10 per cent wage increase plus other benefits. . . . ¶Work begins on 40,000-bbl. refinery in Bombay by Burmah-Shell Refineries, Ltd. . . . ¶Indian cabinet member defends high products prices, tells parliament not to follow "Mossadegh method" in dealing with the oil industry. . . . ¶NATO seeks bids for steel pipe for proposed 1,920-mile European products system. . . . Actual work on $100,000,000, 1,920-mile military pipe-line network scheduled to begin this fall. . . . The project will supply aviation gasoline and other products to more than 100 western European air bases and other installations. . . .

PIPE LINES.—World's deepest underwater pipe-line crossing is completed as the second 20-in. crude line of Lakehead Pipe Line Co. is pulled across the Straits of Mackinac. . . . ¶Government studying the feasibility of a 36-in. products line from the Midwest and Gulf Coast to the country's eastern seaboard strictly as a defense measure. . . . The line would supply the East Coast and relieve tankers for overseas transportation of military oil products. . . . Possibility of defense conversion of one of the "Big Inch" lines, now carrying natural gas, to oil also is being studied. . . . ¶Contracts are let for the construction of Yellowstone's 540-mile, 10-in. line from Billings, Mont., to Spokane, Wash. . . .

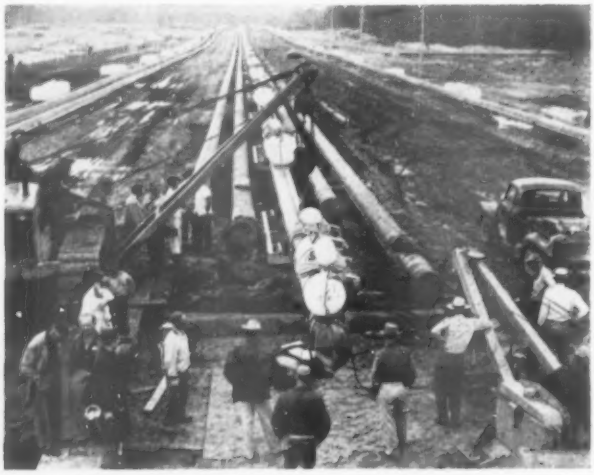
REFINING.—Bechtel Corp. gets contract to build Shell's 50,000-bbl. refinery at Anacortes. . . . Actual field construction will not get under way until mid-1954, but clearing 700 acres for the plant site will begin soon. . . . ¶Imperial completes expansion of Ioco refinery. . . . Facilities include British Columbia's first catalytic cracking unit. . . . Crude capacity now totals 22,500 bbl. daily. . . . ¶All-electronic systems for process-unit instrumentation in refineries described as more reliable, more flexible in control, and leading to more instrument utility at I.S.A. meeting. . . .

EXPLORATION.—Amerada's 1 W. E. Logan in the Fryburg area of Billings County, North Dakota, indicates production of high-gravity oil from Heath, a new pay for Williston. . . . ¶Champlin Refining Co.'s rank wildcat in Woods County, Oklahoma, gets oil and gas shows which appear to be the best yet in this section of the huge Anadarko basin. . . . Well found oil in Simpson sand and gas distillate in the Arbuckle and Simpson dolomite. . . . ¶New FM carrier system said to achieve greater dynamic range and frequency response for recording geophysical data than conventional photographic systems. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,452,500 bbl. daily for week ended September 19, down 28,875 bbl. daily. . . . ¶Total well completions for the week decreased 33 wells to 963. . . . Wildcat completions increased 24 wells to 241. . . . ¶Rotary rigs operating in the United States increased 46 rigs for week ended September 21 to 2,617. . . .

TRENDS.—Refinery runs averaged 6,992,000 bbl. daily for week ended September 19, the first drop below 7,000,000 bbl. daily in 17 weeks. . . . Major product stocks increased only 1,741,000 bbl. for the week, the smallest addition in 12 weeks. . . . Gasoline stocks are 25,000,000 bbl. higher than last year. . . .

LAUNCHWAY from above. Second crossing of the Straits was made in a little over 65 hours after several delays due to stormy weather.



ALL EIGHT of 2,500-ft. sections making up the line rest in position on the launchway. Here, first section, with floats attached, is about to be pulled.

Crossing Completed

Second 20-in. crude line pulled across Mackinac Straits in 65 hours, ending deepest water crossing ever attempted

ST. IGNACE, Mich. — The world's deepest and most spectacular underwater pipe-line crossing was completed last week.

Shortly before 9 a.m. September 20 the forward end of the first section of pipe emerged from the water on the south shore of the Straits of Mackinac, heralding the end of a complicated and costly project which was begun August 9.

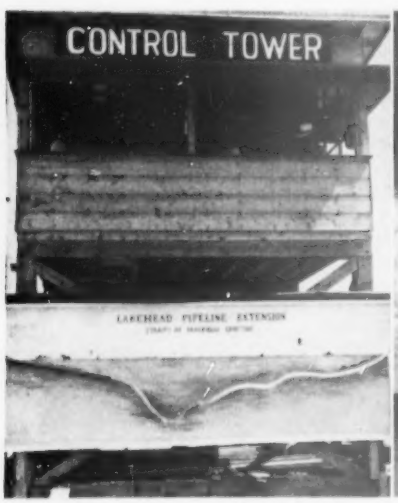
The crossing just completed was the second of two 20-in. crude lines pulled by Merritt, Chapman & Scott Corp. for Lakehead Pipe Line Co. It was pulled in only a few minutes longer than 65 hours, after several delays because of stormy weather. The first line, laid about 1,300 ft. to the west, required 6½ days and was complicated by the breakdown of the pulling winch *(The Oil and Gas Journal, August 24, page 171)*.

Last week, with both lines in place and welding completed, the contractor was backfilling the west line, which had been laid in a trench out to a water depth of 60 ft., and recovering from the second line pontoons which had been used to give the line buoyancy and reduce drag on the bottom.

Together the two 20-in. lines constitute the crossing by the 30-in. Lakehead line of the 20,000-ft. wide Straits of Mackinac. They were spaced far apart as "insurance" in the event of damage caused by a dragging ship anchor or other casualty. The crossing is designed so that they can be used simultaneously or independently.

Pulling operations for the second line were identical to methods used in the first operation except that two steam-pulling engines were employed in pulling the second line. *(For an engineering article describing the technique used in the first line, see The Oil and Gas Journal, September 21, page 168.)*

Both sections of the crossing have been pressure tested. In this operation a 4-in. line was run inside the 20-in. line for a distance of about 1 mile out into the water from the north bank. Water then was pumped through the 4-in. line so that the crude line would fill from the center in both directions. This was done so that the weight of the water would help to settle the pipe



OPERATION WAS CONTROLLED from this tower. Animated schematic painting at base of tower shows progress of line across the straits.

PIPE WAS PULLED across Strait with this 2-in. steel cable by powerful winch located 2,500 ft. inland from south shore.

on bottom and pull slack from the sides of the crossing.

The crossing of the straits constitutes the most difficult portion of the 644-mile Lakehead line, which will extend the existing Interprovincial line from Edmonton to Sarnia. The Interprovincial line will be the world's longest continuous crude-oil trunk line, stretching a total distance of 1,765 miles.

Small Refiner Alarmed

NPA told excess capacity may eliminate small refiners, avgas demand will increase until jet engine takes over

George Weber

ATLANTIC CITY. — The nation's smaller refiners are becoming increasingly alarmed at the threat of oversupply in the oil industry. Brought about by the use of "excess" capacity created at the Government's request, this situation most severely affects the small plants, said A. W. Scott in his president's address at the fifty-first annual meeting of the National Petroleum Association here.

Scott, also president of Wolf's Head Oil Refining Co., Oil City, Pa., called strongly for some solution to this problem lest it result in the loss of the strong competitive element represented by small refiners, defeating the policy of excess, strategically located capacity.

No answer has yet been reached on what to do with excess capacity during "normal" times. "It is obvious that private owners cannot afford to maintain such excess refinery capacity without using it—and unfortunately we are now using it. The result is that we are threatened with an over-supply of petroleum products. This policy is destructive and if long continued it is going to mean the eventual elimination of many refineries."

Aviation fuels . . . The over-all schedule on avgas and jet fuel demands for the future was outlined at the meeting by James H. Doolittle, vice president of Shell Oil Co. Commercial jet planes have a bright future, said he. The first commercial carriers capable of hauling 85 to 100 passengers at 500 m.p.h. should be in limited service in this country by 1960, and wide service by 1965. Hence, commercial avgas demand will increase gradually until the jet engine begins to replace the reciprocating engine.

From the military standpoint, aviation gasoline consumption should increase slightly for the next 2 to 3 years. Jet fuel demand, now considerably below that for avgas, will be boosted with new jet plane use, to surpass gasoline demand by the end of next year. Should a national emergency develop, consumption of avgas would increase greatly with expanded use of piston-engined craft for airlifts.

We are rapidly approaching the time when petroleum products will no longer fill the jet engine lubrication bill, said Doolittle. The modern jet engine is already critical on conventional lubricants and the coming need is for synthetic lubes. Normal increases are forecast for conventional lubes for the next few years, on the basis of projected civil and military flying, but petroleum-based oils do not meet the needs of jet engines, and will decline in demand as conversion progresses.

Doolittle stressed the critical need for expanded and improved airport facilities in this country. There is a clear parallel, said he, between our overloaded airports and our overcrowded highways.

Washington views . . . Government-industry relations received attention at the general sessions of the meeting. Special guests, Secretary of the Interior Douglas McKay and Deputy Petroleum Administrator for Defense Joseph LaFortune spoke briefly on the PAD. Secretary McKay cited the industry for its record of cooperation in providing top-flight personnel for the administration and noted that other industries would like to follow suit with similar agencies staffed by technical and administrative representatives. He restated the administration's pledge that it will place no road blocks in the way of private development of natural resources and reminded industry that it must continue to serve the public interest and to stress the conservation of natural resources.

The present activities of PAD were outlined by Deputy Administrator LaFortune. He expressed a willingness to serve out his full year of service, although some question exists whether it should be necessary in view of the decline in problems remaining before that body.

Stephan F. Dunn, general counsel for the Department of Commerce, asked for the assistance and support of industry in the department's aim of aiding free enterprise. He noted the streamlining of the department and steps taken to get out of business. Genuine business statesmanship, said he, can result when businessmen go out of their way to:

. . . Keep well informed on current events.

. . . Study what the Eisenhower administration is trying to do for better understanding of its problems and needs.

. . . Encourage government service as full-time or part-time officials, unpaid members of surveys, commissions, councils and other advisory groups.

Reelected for a second year's term of office were all current officers of the association: president, A. W. Scott, Wolf's Head Oil Refining Co., Oil City, Pa.; first vice president, Fred G. Bannerot, Jr., Elk Refining Co., Charleston, W. Va.; second vice president, Paul R. Beck, Pennsylvania Refining Co., Butler, Pa.; and general counsel, Fayette B. Dow, Washington.

Clearing Saw Tested

Machine built for cheaper clearing of right-of-way

TEXARKANA, Tex.—A mechanical monster is cutting trees at the rate of one per minute in clearing land for the Sulphur River flood-control reservoir near here in a field test of new equipment being developed by R. G. LeTourneau, Inc., Longview, Tex.

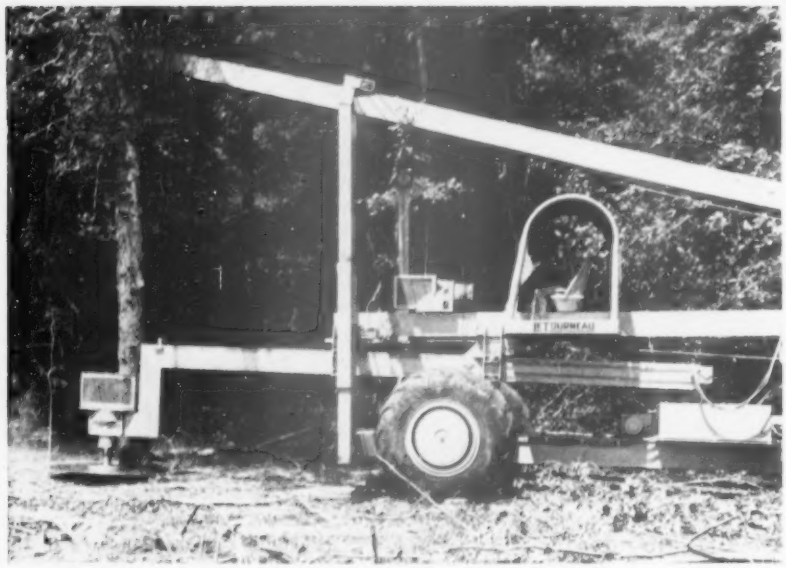
The chief actor in the demonstration is a tractor-like vehicle 35 ft. long, with two protruding retractable booms which can swing in an arc of about 30 degrees. The lower boom carries a 72-in. circular saw which cuts trees at the ground level. The upper boom pushes against the tree about 20 ft. above the ground while the cut is being made, and shoves the entire tree to one side as it falls.

This machine and companion equipment is being offered to the oil and other industries for clearing pipe-line right-of-ways, roads, and similar purposes.

Used in conjunction with the "Tournasaw" is a versatile tractor which is a sort of a cross between a bulldozer and a fork-lift truck and which stacks entire trees for drying and burning.

Another piece of equipment being tried out is a "tree stinger" which has a 75-ft. boom which can grasp a tree near its top while its base is being cut and then pull the tree out of the way. It is expected to find a use in handling trees overhanging a river bank, and in tropical jungles where a mat of tree-top vines prevents trees from falling after they are cut.

The new line of land-clearing equipment is built around the LeTourneau principle of having each moving part actuated by its individual electric mo-



SAWDUST FLYS as LeTourneau's new "Tournasaw" bites into a tree and its boom prepares to push the timber aside when the saw is finished.

tor, all powered by a self-contained diesel generator. The Tournasaw, for instance, has 11 electric motors. Each 72-in. rubber-tired wheel is turned and braked by a separate motor, and two other motors accomplish the four-wheel steering. Other motors raise, extend, or swing the booms and spin the saw.

Without moving the machine, the saw can be moved 16 ft. forward or back, 21 ft. from side to side, and from 18 in. below grade to 6 ft. above the level of the front wheels. The manufacturer believes the machine will clear heavily forested land at about half the cost of conventional methods.

Panel Talks Corrosion

NPA group says mounting losses to industry point up need for inhibitors that can be evaluated, applied to problem

ATLANTIC CITY.—Corrosion control is big business, but it needs to be bigger. Many new inhibitors, developed and adopted by the oil industry show promise, but their actions are complex and their evaluation difficult. A more realistic buyers' approach is needed on tests and specifications.

These conclusions highlighted a special symposium on rust preventives and corrosion control at the annual meeting of the National Petroleum Association.

The urgency for control of corrosion waste mounts with rising losses to the petroleum industry, said F. M. Watkins and R. I. Lindberg of Sinclair Research Laboratories, Inc., Harvey, Ill. Corrosion costs comprise lost production time, lost products, labor for replacement and repairs and cost of repair materials.

Costs double . . . In the refining division alone salaries have risen more than 150 per cent since 1939 and metal costs have more than doubled, calling for increased activity in corrosion control. The authors presented a progress report on hydrocarbon soluble and water soluble types of inhibitors employed in all branches of the industry.

While considerable strides have been made with these inhibitors, too little is known of the mechanism and limits of their action. Hence their evaluation for specific applications cannot be carried out with scientific precision. The maximum usefulness of these inhibitors and others to follow, will depend on the ingenuity of corrosion engineers, they concluded.

Tanker rust . . . W. S. Quimby of The Texas Co. discussed rust prevention in tankers, pipe lines, tank cars and trucks and containers. Interior corrosion in tankers, said he, costs as much as $50,000 per year per tanker. New oil soluble inhibitors comprising surface active type of high molecular weight organic acids or esters are currently attracting much attention from tanker owners.

The same organic oil soluble inhibitors appear to offer the most promise for internal rust prevention in pipe lines. Dosages of 3 to 6 lb. per 1,000 bbl. are generally sufficient to lay down a protective film which resists penetration of water to the metal surface. Surpassing most inorganic inhibitors in giving complete rust protection, the organics are also effective throughout long distances and require injection only at the initial point on a pipe line.

Test procedures . . . A rust preventive is judged by its performance in actual service. Service data is difficult to interpret. The problem is to evaluate a product by means of suitable standardized laboratory procedures. Many present laboratory tests fail to meet this need accurately, said H. A. Ambrose, E. E. Fisher, and E. S. Francis of Gulf Research & Development Co. In their paper on laboratory performance testing of petroleum-based rust preventives, they outlined the standard tests and noted their shortcomings.

These test procedures were credited with much value in the development of inhibitors, when employed by competent technicians who understood their limitations. But, in view of the present status of the art, the authors were critical of manufacturing and purchase specifications for rust preventives which incorporate these performance tests at an arbitrary level on a pass or fail basis.

"We do not believe that laboratory methods for testing rust preventives other than the well-established A.S.T.M. D665-52T, are generally suitable for examination and approval of samples from commercial production," they concluded. They called for a broadened understanding of the requirements of these materials and the way in which these requirements can be assessed by the use of better laboratory tools.

Field data . . . The importance of field data in evaluating rust preventives was stressed by E. J. Schwoegler of Armour Research Foundation, Illinois Institute of Technology. He urged manufacturers to tap this source of information through their sales and service personnel. The viewpoint of the steel industry was given by R. B. Hoxeng of U. S. Steel Corp.'s Research and Development Laboratory. He discussed testing procedures and outlined a method using a cyclic-sweating cabinet, which was recommended for testing inhibitor compounds.

Phillips Milestone

Company becomes thirtieth with assets over a billion

BARTLESVILLE, Okla. — In 1917 Phillips Petroleum Co. was organized with assets totaling $3,000,000. These assets recently passed $1,000,000,000—making the company one of only 30 such corporations in all American industry this big.

Phillips has quadrupled its size in the last 10 years—doubled it in the last 5 years. Its rate of growth in the last decade has been the greatest of any of the billion-dollar companies, which include 10 oil firms.

The company's feat of reaching the billion figure in 36 years starting from scratch in 1917 is faster than any other oil company managed to do it, excepting those having predecessor companies with large integrated operations.

Visible evidence of Phillips' present stature in the industry lies in the figures. The company is the leading producer of natural gas and is generally conceded to own the largest natural-gas reserves. It is the leading producer-marketer of L.P.G., of natural gasoline, and of furnace carbon blacks made from oil. It operates seven refineries with a capacity of roughly a quarter of a million barrels of oil a day and was one of the first oil companies to jump into the relatively new and rapidly expanding petrochemical industry. It has one of the most diversified groups of products of any oil company.

Phillips income has more than kept pace with its assets growth. Last year both gross and net income were five times higher than 10 years earlier.

Texas Co. Answers Suit

NEW YORK.—"Substantial and far-reaching benefits" from its oil activities abroad were cited by The Texas Co. here last week in an amended answer to the Department of Justice's antitrust suit against the company and four other large American companies operating overseas.

The company said its actions abroad eliminated the drain on American sources of crude oil to supply its marketing demands abroad, developed new, additional sources of crude to supplement American supply during periods of shortage, and provided the armed forces with large quantities of products vitally needed in foreign areas during and since World War II.

"The Texas Co. and the companies in which it has an interest will continue to be aggressive, independent competitive forces in the foreign oil field, if their progress is not retarded or nullified by an uncertain national policy which on the one hand encourages American oil companies to make the heavy expenditure of time, money, and effort necessary to discover and produce oil abroad, and on the other hand prosecutes them for being successful," the answer said.

Merger Delayed Indefinitely

NEW YORK. — Negotiations to merge Cosden Petroleum Corp. and Southern Production Co., Inc., have been set aside indefinitely by agreement of the officers and directors of both companies.

The merger has been of interest throughout the industry since it would bring together a refining firm and a producing company. Cosden owns a 25,000-bbl. refinery in Big Spring, Tex., and Southern Production has extensive oil holdings in Louisiana, Oklahoma, Texas, and Wyoming.

Alaskan Line Meeting Set

SEATTLE. — A meeting between Alaska district Corps of Engineers representatives and pipe-line contractors interested in submitting bids on the proposed 615-mile Alaskan products line will be held here October 1.

The purpose of the meeting is to clarify the scope of work involved in construction of the line, which will run from Haines to Fairbanks, Alaska. The Corps of Engineers is now accepting construction bids, which will be opened here October 14.

MEETINGS

Gulf Coast Meeting Set

SHREVEPORT.—The third annual convention of the Gulf Coast Association of Geological Societies will be held here October 22-24 with headquarters at the Washington Youree and Captain Shreve hotels. Registration will begin October 21.

John B. Hussey, Louisiana conservation commissioner, and C. L. Moody, president of Ohio Oil Co., and former president of the American Association of Petroleum Geologists, will be the principal speakers. The program also includes presentation of 13 technical papers and a field trip over Upper Cretaceous and Paleozoic outcrops in southern Arkansas, October 24-25.

Technical papers to be presented include:

"The Calcasieu Lake Salt Dome, Cameron Parish, Louisiana," W. E. Wallace and B. H. DeHart, Jr., Forest Oil Corp.; "Summary of Ground Water Conditions in Southwest Louisiana," Rex. R. Meyer, United States Geological Survey; "Big Foot Field, Frio County, Texas," Don R. Dunham, Shell Oil Co.; "History of Imogene Field, Atascosa County, Texas," John W. Bolinger, Humble Oil & Refining Co.

"Variations in Porosity and Permeability in the Wilcox Group of the Texas Upper Gulf Coast," E. L. Grubbs, National Bank of Commerce, Houston; "A Volcanic Cycle, as Exhibited by Italian Volcanoes," Fred M. Bullard, University of Texas; "The Mineralogy of the Salt and Cap Rock of Gulf Coast Salt Domes," Ralph E. Taylor, Humble Oil & Refining Co.; "Certain Stratigraphic Problems of the Black Warrior Basin," Rizer Everett, Carter Oil Co.

"Jurassic and Older Beds with Relation to the Gulf of Mexico," Roy Hazzard, Gulf Refining Co.; "Cotton Trend Line Fields in North Louisiana," John H. Crump, Southwest Gas Producing Co.; "How to Secure Exploration of Your Pet Areas Without Drilling," C. N. Valerius, consulting geologist; "A Critique of the Magnolia Field Case History, Columbia County, Arkansas," Dr. E. E. Rosaire, consulting geophysicist, and J. M. Forgotson, consulting geologist; and "East Haynesville Field," John T. Palmer, Lyons, McCord & Logan.

Leach, Burns to Speak

HOUSTON.—Speeches by J. Sayles Leach, chairman of The Texas Co.'s board of directors, and H. S. M. Burns, president of Shell Oil Co., will highlight the thirty-fourth annual meeting of the Texas Mid-Continent Oil & Gas Association here October 6-7.

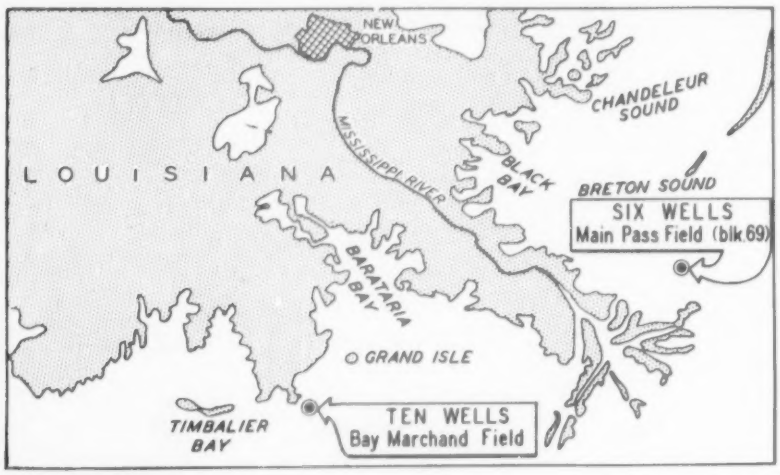
Other speakers scheduled for the meeting include Jerome K. Kuykendall, chairman of the Federal Power Commission, and Robert F. Windfohr, Fort Worth independent oil producer and president of the association. Election of officers and presentation of the association's distinguished service award to two outstanding petroleum industry leaders in Texas also are planned.

A.G.A. Program Set

ST. LOUIS.—Operating problems of small natural gas companies are among the topics to be discussed at the thirty-fifth annual convention of the American Gas Association at Kiel auditorium here October 26-28.

The program also will include papers on corrosion control, acquisition of underground gas storage rights, gas turbine driven centrifugal compressor for gas transmission, and a panel discussion on over-pressure protection.

Jerome K. Kuykendall will address the group on his 5 months as chairman of the Federal Power Commission. F. M. Partridge of Southern California Gas Co., Los Angeles also will discuss progress being made in volume measurement.



Gulf Program Started

California Co. kicks off 16-well drilling, development program off Louisiana Coast with new drilling platforms

William P. Sterne

NEW ORLEANS. — The California Co. has kicked off its drilling and development program, involving 16 wells, in two areas in the Gulf of Mexico off the coast of southeastern Louisiana, adjacent to waters of the government-controlled Continental Shelf.

This marks the first big-scale development offshore from Louisiana since the tidelands controversy was resolved by Congress.

The company last week had:

. . . **Already started drilling** the first of six development wells in Main Pass Block 69 field from a new drilling platform fabricated especially for the job.

. . . **Spudded in** the first of 10 development wells at Bay Marchand from a new drilling platform.

. . . **Reactivated** two LSTs from a "mothball fleet" of offshore drilling and exploratory equipment at Harvey, La., for use in connection with the renewed development program.

Calco was careful to point out that both of its drilling programs are "well within the gulfward boundary."

Calco busy . . . The two LTSs recently reactivated by Calco had been under "monthballs" for about 4 years, awaiting the time when work could be resumed on Gulf of Mexico leases. Fabrication of the two new drilling platforms marks the first construction of such units since the tidelands issue was settled.

Main Pass . . . The company is using its LST "S-23" at "B" structure in Block 69 field, where it is serving as a floating warehouse, handling the chores of platform tender and serving as quarters for the drilling crews. The LST can accommodate drill pipe, casing, muds, chemicals, and related drilling equipment for use in connection with the platform.

Bay Marchand . . . Drilling operations got under way on September 18. The new offshore drilling platform was specially fabricated for the job, and will accommodate 10 wells. The other reactivated LST will serve as tender for this platform.

Veteran offshore . . . Calco is a veteran in offshore operations in Louisiana. It discovered Block 69 field at Main Pass, and brought in the first commercial production around the big Bay Marchand salt dome. Main Pass was the second offshore oil-field discovery for Louisiana, discovered in August 1948. Kerr-McGee Oil Industries, Inc., has the credit of bringing in the first offshore field—Ship Shoal Block 32, in November 1947. Shell Oil Co. was also active at Main Pass and brought in its first offshore well in Block 69 field on February 25, 1949. Wells in the area produce from sands at 5,800 and 8,200 ft.

Discovered in 1927 . . . The Bay Marchand salt dome, one of the largest such structures in the world, was discovered in 1927 by a refraction-seismograph survey. Geologists have estimated that as much as 56 cu. miles of salt is contained in the dome.

An unsuccessful test was drilled on shore in 1930 to a depth of 6,380 ft. A number of additional wildcats were drilled in following years. Most were failures.

Calco became interested in the area in 1947 as a result of offshore reflection-seismograph work. On February 17, 1948, the company leased 13,000 acres from the state for approximately $1,000,000. Three drilling platforms were erected and an active drilling program begun.

The first test was a dry hole but it landed right on top of the salt dome as planned, thus helping to correlate subsurface study. Initial wells on both of the other platforms hit pay sands.

The discovery well at Bay Marchand, brought in on March 3, 1949, produced from pay from 2,873-92 ft. By January 1950, 10 wells had been completed in the field, plus two dry holes.

Calco laid the first offshore pipe line to Bay Marchand in mid-1949.

Tidelands record . . . At the peak of tidelands activity—before the Government stepped in and suspended all new drilling programs, the petroleum industry was spending about $60,000,000 a year offshore below the low-tide mark, and was producing oil at a rate of 2,000,000 bbl. annually. At the then-current price of an average of $2.80 per barrel for oil, this represented a return of about 10 per cent on investments.

Shelf Work Near

Interior gives operators go-ahead off Texas coast

WASHINGTON.—Operators holding state leases for exploration and development of oil and gas in the outer Continental Shelf off the coast of Texas have been authorized by the Interior Department to go ahead with their operations pending the issuance of formal regulations for federal management of the area.

The department published an order last week authorizing the holders of state leases which are exchangeable for federal leases to go ahead with their geological and geophysical exploration in those areas of the Continental Shelf where the secretary has entered into a cooperative agreement with the appropriate supervisory agency of the ad-

joining state covering the protection and conservation of aquatic life.

The necessary agreement has been entered into with the commissioner of the Texas general land office *(The Oil and Gas Journal, September 21, page 155)*. Operators off the Texas coast will have to conduct their activities in compliance with the requirements of Texas governing the methods of and restrictions upon geological and geophysical exploration.

Enforcement of the temporary regulation is delegated to the regional oil and gas supervisor of the U. S. Geological Survey, who may accept the assistance of the state in its enforcement. The authorization to conduct operations is subject to termination upon not less than 60 days' notice.

Louisiana Leases 19 Tracts

BATON ROUGE.—The Louisiana mineral board has leased 19 tracts of state-owned land, covering 12,378 acres for $938,276 in cash bonuses.

The largest lessee, Richardson & Bass, paid $511,000 plus a three-sixteenths royalty for 3,470 acres in the Little Lake area of Lafourche and Jefferson parishes. In the same area, Humble Oil & Refining Co. obtained tracts of 1,500 acres and 1,000 acres for $154,305 and $102,870, plus a one-sixth royalty.

WEST COAST

Anacortes Contract Let

LOS ANGELES.—Shell Oil Co. has awarded contract for its 50,000-bbl. refinery to be built at Anacortes, Wash., to Bechtel Corp., F. S. Clulow, vice president in charge of manufacturing, announced September 22.

Actual field construction of refinery units will not start until about mid-1954, he stated, but clearing of the 700-acre plant site will begin shortly.

R. W. McOmie, Shell's West Coast refinery coordinator, said that major refining units will consist of a crude-oil fractionating unit, a platformer, and a catalytic cracker.

The crude unit and platformer will be finished by mid-1955 and the remaining units, including the cat cracker, by the end of 1955. First units, however, will be put in operation in advance of total completion, McOmie added, or about mid-1955.

Tidelands Wildcat Started

LONG BEACH. — The first California tidelands exploratory test to be started since title to its submerged lands was affirmed by Congress last spring is now under way at Newport Beach.

The wildcat is being drilled by Monterey Oil Co., jointly with Humble Oil & Refining Co., from an upland site outside Newport Beach city limits. Its objective will be Miocene sands at a vertical depth of about 6,000 ft. and about 1,700 ft. seaward from the well site.

Newport Beach, like Long Beach, was granted title to submerged lands for a distance of 3 miles from shore by the state in 1919. Thus if 1 Newport Beach successfully opens a new oil pool, the city will receive a royalty beginning at 12½ per cent for the first 80 bbl. of oil and increasing upwards in accordance with the State Lands Commission formula.

For granting the drilling easement under their properties, Pacific Electric Railway and a group of beach property owners also will benefit if production is found.

Suit Settled for $26,700

LOS ANGELES.—Industrial Carbon & Engineering Co. settled its $50,000,000 suit against Union Oil Co. for $26,700 and relinquished future claims for an interest in a process it claims has earned Union profits of $100,000,000.

Industrial Carbon sued for half the profits from a process to separate industrially useful gases from waste hydrocarbon mixtures. The plaintiff company complained Union agreed to develop the process under a contract made in 1952 and divide the profits equally between the two.

Ohio Well Below 20,950 Ft.

LOS ANGELES.—The world's deepest well, Ohio Oil Co.'s Paloma field deep test near Bakersfield, last week passed 20,950 ft., more than 400 ft. deeper than any well ever drilled before.

Originally scheduled to test Oligocene and Eocene sands, expected at about the present depth of the well, the well was still going deeper as Ohio geologists were not sure the lower Miocene had been penetrated.

77-Year-Old Well Flowing

NEWHALL, Calif.—California's oldest commercially productive oil well passed its seventy-seventh birthday in Pico Canyon near here last week.

Pico No. 4 was drilled in 1876 by the California Star Oil Co. and flowed 150 bbl. daily from a depth of 600 ft. The well has flowed continuously since that time, but its production now amounts to only about 2 bbl. per day.

Feather-Weight Crude Line

This plastic pipe line, 3 in. in diameter and 9 miles long, is being laid from the C. C. Thomas lease in East Poplar field to a railroad loading rack at Poplar, Mont., by Plastic Service Lines, Inc., Denver. The pipe is manufactured by Johnson Plastic Corp., Chagrin Falls, Ohio, weighs about 0.65 lb. per foot, and has a calculated bursting limit of 380 psi. Three pumps are being installed along the 9-mile length in order to keep down pressure. The pipe is extruded from Tenite butyrate plastic, and the manufacturer says that paraffin will not adhere to it. Paraffin is particularly troublesome in East Poplar crude, and the wells and steel gathering lines require frequent scraping.

EXHIBIT AREA at the instrument conference. Value of equipment displayed exceeded $10,000,000. More than 34,000 sq. ft. of space was devoted to 307 booths for more than 210 companies. Nearly 15,000 people attended the conference.

Aid to Process Control

New all-electronic instrument system is more reliable, provides increased utility and flexibility, I.S.A. told

Gerald L. Farrar

CHICAGO. — Use of all-electronic systems for instrumentation of process units in oil refineries leads to greater instrument utility, greater control flexibility, and more reliable process control. Investment costs are competitive with the more conventional instrumentation systems.

This was announced here last week by W. T. Marchment, Evershed and Vignoles, Ltd., London, England, in a paper presented before the eighth annual National Instrument Conference and Exhibit. The meeting, held September 21-25, was sponsored by the Instrument Society of America.

The above conclusions were gleaned from pilot-plant investigations and the operation of a commercial refining unit, Marchment told the session on Process Control Instrumentation. Comparisons with conventional pneumatic or combination pneumatic-electronic systems also show that the all-electronic systems can be more easily maintained, he added.

Operating results were obtained on a sulfur dioxide extraction plant at one of the British refineries of the Anglo-Iranian Oil Co., Ltd., Marchment said. The plant which was designed for a throughput of approximately 4,000 bbl. per day now produces about 5,000 bbl. per day of premium-grade kerosine. The all-electronic instrumentation consists mainly of level, flow, and pressure control, with associated electrical alarms for high level and excess pressure.

How it operates . . . A current transmitting system is used to relay to the controller the value of the measured variable—such as temperature, pressure, flow, or liquid level. The controller itself is merely a modified current transmitting system.

The transmitter used for all measuring elements is a torque-balancing device in which the torque exerted by the originating movement is balanced by the torque of a coil operating in the cathode circuit of a thermionic tube. The balancing coil is connected in series with simple milliameter movements in indicators, recorders, and controllers, which therefore receive signals proportional to the measured quantity.

When in balance, a contact connected to the grid of the tube and carried by the balancing coil is in a neutral position between two fixed bias contacts, the voltage on the grid being maintained by a storage capacitor between grid and cathode.

Any imbalance created by a change in the quantity being measured causes the grid contact to touch the positive or negative bias contact, thereby raising or lowering the plate current until the system is again in balance. The transmitter compensates automatically for any change in supply voltage, circuit resistance, or frequency.

Reset and derivative control components may be added to the system by adding additional circuits. In each circuit, variation in current flow changes the intensity of light falling on two photo cells. Current flow in the photo-cell circuits is altered proportionately, and corrective action is brought about by this current change. A time effect is introduced by including capacitors in the circuits. Changes in the values of the control components are made by adjusting calibrated resistors which are included in each circuit.

Manual control feature . . . The all-electronic system may be switched from automatic to manual control, or vice versa, without disturbing the stability of the process, Marchment said. The manual control current is derived from an independent rectified supply. This current is varied by a manually operated resistor in opposition to the controller output. The positioner on the control valve is adjusted by the net current flowing after the manual resistor setting is made.

The various control components are mounted on small trays which are plugged into the rear of the controller case, he said. One tray also includes the thermionic tube and associated power supply of the transmitting unit. Spare trays are furnished with each instrument. When maintenance is required, a spare tray is plugged in, and the replaced tray can be repaired without any upset in the process.

All-electronic instrumentation systems are currently being installed on crude topping and catalytic polymerization units which are under construction in an Anglo-Iranian refinery.

Automatic control trend . . . The rate of industrial instrument buying for new plants has increased sharply in the last decade, P. V. Jones, Jr., I.S.A. manager, said.

Likewise, the proportion of instrumentation based on total plant equipment has risen rapidly. It increased from 5 per cent in 1939 to 20 per cent at present, and the trend is still upward, he said.

Kewanee Performs Big Fracturing Project

One of the biggest fracturing jobs attempted in the Mid-Continent area was performed last week on this well of Kewanee Oil Co. in Ringwood field of Major County, Oklahoma. Dowell Incorporated in a sand-fracturing operation pumped in 30,000 gal. of oil and 100,000 lb. of sand in Kewanee's No. 1 well on its Gauley B. lease. The well, completed in December of 1949 with a flow of about 450 bbl. per day, had declined in output to about 19 bbl. a day. Production is from the Manning lime at about 6,825 ft. Maximum pump pressure used in the fracturing operation was 2,300 psi. Biggest fracturing operation to date was a 100,000-gal. and 100,000-lb. project performed for Sun Drilling Co. in southern Oklahoma in July.

New Exploration Tool

Greater dynamic range, frequency response in recording geophysical information obtained with FM carrier system

CHICAGO.—A newly developed FM carrier system for recording geophysical exploration data was described here last week as a big improvement over photographic systems.

Speaking before a session on geophysical instrumentation at the eighth National Instrument Conference, Myron J. Stolaroff, Ampex Corp., Redwood City, Calif., said its advantages over the photographic systems include greater dynamic range and frequency response.

Intelligence, Stolaroff said, is stored in the new system as the rate of zero crossings by converting the input signal to FM form and recording the FM signal on a magnetic tape. It therefore is independent of reproduced amplitude.

Use of a suitable discriminator restores the signal to its original form, free of amplitude variation, with negligible phase shift, and with excellent transient response, Stolaroff said.

In an FM system the variations in tape motion become the noise background. A wide deviation system is therefore employed to overcome the effect produced by flutter in the tape transport. In the playback system the signal first passes through three stages of amplification and severe limiting to effectively eliminate any amplitude variations in the output of the playback head.

The resulting square waves are differentiated to produce pulses of uniform wave shape, and these pulses are counted in an integrating circuit to yield an output proportional to the time rate of pulses.

Performance characteristics . . . Good response to low frequencies, even to d.c., can be obtained with equipment now available. Good high-frequency response, up to 5,000 cycles, also is obtained. For seismic work, the response may be limited to 500 cycles or less. At this value tape speeds up to 30 in. per second may be used with resultant signal to noise ratio of 50 or more.

Simultaneous recording of a large number of channels can be obtained with a multitrack head assembly. The unit is kept compact by stacking the heads one above the other, with adequate shielding between heads to prevent cross talk between channels.

Records obtained using this new system can be played over and over again until the best possible combination of filter characteristics is obtained. By repeated reproduction of wide band records with filters set to various bands, shallow, medium, and deep reflections may be examined from one shot record.

Also, gain and mixing characteristics can be varied so that particular sections of the record which are of interest can be blown up. The dynamic range of the process is sufficiently great so that portions of the record, which have dwindled to mere lines on an oscillograph reproduction, can be blown up to show significant fluctuations.

Correlation possibilities . . . Current work indicates that it may be possible to develop automatic correlation techniques which will enable the identification of certain geological conditions from analysis of the recordings.

Should this prove possible, it will then be necessary only to run each magnetic record through a correlation computer to determine automatically the desired information.

Development work on the system at the present time is being directed toward producing suitably compact and miniaturized equipment.

New Sarnia Cat Cracker

This new refinery at Sarnia, Ont., is due for completion in October when Sun Oil Co. expects the 15,000-bbl. per day, $10,000,000 plant, to go on stream. This picture of the 11,500-bbl. Houdriflow catalytic cracker was made several months ago. This intergral reactor-kiln type of unit is designed to process Texas, Louisiana, and Canadian crudes and will circulate 300 tons of catalyst an hour.

Secondary Stocks Up

But they still were below those of 1952 on August 1

SECONDARY inventories of the four major products increased 2,851,000 bbl. daily during the month of July, but at the end of the month the total was 4,154,000 bbl. less than for the same date last year.

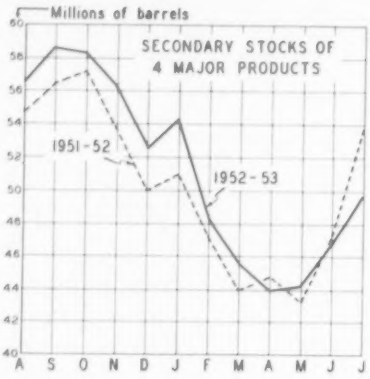
The monthly report by the Census Bureau of the Department of Commerce estimated July 31 stocks at 49,831,000 bbl. compared with 53,985,000 bbl. for July 31, 1952, a decrease of 7.7 per cent.

The upward trend in secondary stocks during the summer months is normal, but data have not been available over a long enough period to determine the amount of a normal increase for July. The increase in July 1952 was 2.4 times the increase in July of this year.

More than half of the decrease in stocks from July last year was reported for District 2. Stocks in this district were down 2,142,000 bbl., including a reduction of 1,016,000 bbl.

SECONDARY INVENTORIES OF MAJOR PRODUCTS
(Thousands of barrels)

	July 31, 1953	June 30, 1953	July 31, 1952
Gasoline:			
Dist. 1	5,397	5,240	5,838
Dist. 2	8,529	8,671	8,747
Dist. 3	2,969	2,946	3,150
Dist. 4	1,034	967	926
Dist. 5	2,093	2,161	2,329
Total U. S.	20,022	19,985	20,990
Kerosine:			
Dist. 1	2,818	2,727	3,347
Dist. 2	2,786	2,622	3,346
Dist. 3	705	677	718
Dist. 4	120	88	92
Dist. 5	103	120	110
Total U. S.	6,532	6,234	7,613
Distillate:			
Dist. 1	9,044	7,953	9,346
Dist. 2	4,877	4,347	5,893
Dist. 3	901	861	948
Dist. 4	490	460	444
Dist. 5	1,165	1,261	1,130
Total U. S.	16,477	14,882	17,761
Residual:			
Dist. 1	4,767	4,153	4,761
Dist. 2	1,315	1,061	1,663
Dist. 3	636	571	1,048
Dist. 4	5	6	13
Dist. 5	77	88	136
Total U. S.	6,800	5,879	7,621
Major products:			
Dist. 1	22,026	20,073	23,292
Dist. 2	17,507	16,701	10,649
Dist. 3	5,211	5,055	5,864
Dist. 4	1,649	1,521	1,475
Dist. 5	3,438	3,630	3,705
Total U. S.	49,831	46,980	53,985



in secondary inventories of distillate. Primary stocks of distillate fuel in District 2 decreased 2.1 per cent for the same period.

Secondary stocks of gasoline in District 2 decreased 2.5 per cent for the year ended July 31. Primary stocks of gasoline increased 20.8 per cent.

Major product stocks in secondary storage in District 1 decreased 5.4 per cent for the 12-month period ended July 31 in contrast with the reported increase of 11.5 per cent in primary stocks for the same period.

By products, the greatest decrease over last year was reported for distillate fuels, down 1,284,000 bbl. The largest percentage decrease was in stocks of kerosine, off 14.2 per cent. Primary stocks of kerosine gained 11.2 per cent in the 12-month period.

The accompanying chart shows secondary inventories of the major products by months since August 1951.

Refinery Runs Cut

Refinery runs for the week ended September 19, averaged 6,992,000 bbl. daily for a decrease of 224,000 bbl. daily over previous week. Runs have been above 7,000,000 bbl. daily for every week since May 23.

The reduction for week ended September 19 represented cuts in all of the major refining districts, but the larger percentage reductions were reported for Districts 1 and 2. District 1 runs were cut 4.2 per cent and District 2 runs were down 5.2 per cent.

Several other refineries announced cuts for the last half of September. Standard Oil Co. (Ind.) reported a reduction of 4 per cent or 15,000 bbl. daily. Pan-Am Southern Corp. cut runs 5 per cent, and Continental Oil Co. announced a 10 per cent cut in refinery operations in Louisiana, Oklahoma, and in the Rocky Mountain states.

Further evidence of surplus crude in the Mid-Continent area was added to the record September 21 when Magnolia Petroleum Co. announced a cut of 25 per cent in its own production in Oklahoma along with a similar cut in the amount of crude purchased within the state. The company reported that a lack of storage space was the reason for the cut.

Penn Grade Price Cut

Soft product market, high production blamed for drop

BRADFORD, Pa. — Pennsylvania Grade crude prices dropped 50 cents a barrel effective September 21.

The new postings were announced by the Joseph Seep Purchasing Agency of South Penn Oil Co. Crude from Bradford and Middle districts in National Transit Co. lines now brings $4.05 a barrel.

Southwest district crude now is posted at $3.61 and Pennsylvania Grade crude from West Virginia in Eureka Pipe Line Co. lines is down to $3.55 a barrel. The new posting for Pennsylvania Grade crude from Ohio in Buckeye Pipe Line Co. lines is $3.54.

The price cut more than offsets the two small increases for Pennsylvania Grade earlier in the year. The present price level is about 20 cents a barrel under the ceilings placed on these crudes in the period of price controls from January 25, 1951 to February 12, 1953.

The purchasing agency reported that a trend toward higher production in several areas, combined with slow sale of some refined products, has brought increases in crude and product inventories at many refineries and has reduced the demand for Pennsylvania Grade crude.

Industry Briefs

TULSA.—Mid-Continent Petroleum Corp. plans to install a 7,500-bbl.-per-day catalytic reforming unit at its 60,500-bbl. refinery here. The unit is expected to be completed and in operation by May 1.

NEW YORK. — Spencer Chemical Co. has awarded a contract to Scientific Design Co., Inc., here for engineering design on a new unit for recovering high purity ethylene from commercially purchased ethylene, at the company's Orange, Tex., petrochemical plant. The unit is part of a new polyethylene plant under construction.

Allowable Reduced

Texas October production shaved another 77,063 bbl.

AUSTIN.—Texas' October allowable has been set at 2,904,409 bbl. daily, a reduction of 77,063 from that set in effect on September 5. It was the second successive cut in production ordered by the Texas Railroad Commission.

The October allowable is based on a 19-day state-wide production schedule with East Texas remaining at 18 days. The allowables set for fields not included in the 19-day schedule were Kelly-Snyder, 15; Pantex, 16; Pickton, 9, and Spraberry, 11.

A breakdown of the average calendar day allowables by districts shows reductions from September 5 in all districts except 1 and 10.

The October 1 allowables mark the second straight month in which the Texas Commission has throttled down the flow of Texas wells because of excessive stocks of crude, gasoline, and heating oils. Ernest O. Thompson, chairman, pointed out that the Bureau of Mines estimate of market demand is 2,880,000 bbl. daily.

Thompson read into the record of the state-wide proration hearing the text of the Texas statute defining waste, including production in excess of "reasonable market demand."

The action of the commission in cutting the allowables came after industry spokesmen urged the 19-day producing pattern for the state generally.

ALLOWABLES BY DISTRICTS
(Barrels per calendar day)

Dist.	Sept. 5	Oct. 1	Change
1	43,179	43,321	+ 142
2	155,785	151,490	— 4,295
3	473,570	463,304	— 10,266
4	269,822	263,787	— 6,035
5	50,823	49,632	— 191
6 (outside E. Tex.)	132,117	128,761	— 3,356
6 E. Tex.	255,152	247,478	— 7,674
7-B	145,660	143,398	— 2,262
7-C	186,679	182,320	— 4,359
8	951,358	913,806	— 37,552
9	224,504	223,825	— 679
10	92,823	93,377	+ 554
Totals	2,981,472	2,904,409	— 77,063

TIPRO Fears Market Loss

AUSTIN.—Reduction of allowables by Texas may result in permanent loss of markets for Texas crude, according to the Texas Independent Producers and Royalty Owners Association.

This conclusion was contained in a special report made by the association's crude-markets committee to M. D. Bryant, TIPRO president. The report said that this failure to produce sufficient crude oil "constitutes an open invitation to disproportionate increases in imports and production from other states."

The committee, headed by Maston Nixon of Corpus Christi, declared Texas is the only state to produce less than market demand for its oil during the last 8 months and recommended that efforts be made to insure Texas producers the right to produce sufficient crude to supply its demand.

Companies charged by the committee with making no reduction in nominations in other states while asking for sharp cuts in Texas allowables were sharply criticized.

Pecos Waterflood Sought

AUSTIN.—Permission to waterflood nine leases on 1,450 acres of the Pecos Valley high gravity field, Pecos County, was sought from the Texas Railroad Commission last week by Clayton N. Smith and others.

John B. Persons, representing the operators, told the commission the 70 producing wells on the leases are now producing an average of little more than 5 bbl. daily per well. Plans call for a 20-acre, 5-spot injection pattern with salt water to be obtained from the Rustler lime at about 700 ft. Persons estimated the project will enable operators to recover an additional 2,750 bbl. per acre from the leases already 30 per cent depleted.

A. R. Ballou, Sun Oil Co., urged approval of the application and said his company expects to participate in a 5-spot offset pattern on its adjacent Scharff-Blackman lease.

Suniland Buys Property

FORT WORTH, Tex.—Suniland Oil Corp., Fort Worth, has purchased producing properties in California, Texas, and New Mexico from Mrs. Elsinore C. Machris, Palm Springs, Calif.

The multimillion-dollar deal involved properties formerly owned by Wilshire Oil Co., which was dissolved early this year. They are located in South Cuyama, Huntington Beach, and Santa Fe Springs, and other fields in California; the Townsend pool of Lea County, New Mexico; the Kelley-Snyder area of Scurry County, Texas; and the Wilshire Ellenburger pool and Spraberry Trend area in Upton County, Texas.

About 200,000 acres of undeveloped leases in Canada, Montana, Utah, Wyoming, Colorado, California, New Mexico, and Texas also were included in the transaction.

New Mexico Holdings Sold

DALLAS.—Beaver Lodge Oil Corp. last week sold 4,000 acres of leases in Cedar Hill and Blanco field, San Juan County, New Mexico, for $1,000,000 to El Paso Natural Gas Co.

It was pointed out that only the gas rights in the Mesaverde formation were sold with Beaver Lodge retaining all oil and deep gas rights. Also, the seller will have an overriding royalty on all gas produced on the properties. El Paso holds an option to explore for deep gas on the leases, taking the production on the same terms as the Mesaverde gas.

First step in the transaction was the selling of Beaver Lodge's fractional interest in 11 wells in the area to El Paso. In addition, the purchaser has agreed to pay $85,000 for each 100 per cent interest well drilled on the properties.

Byrd Acquires Properties

DALLAS.—All producing and undeveloped oil properties of McConnell Drilling Corp., Dallas, have been acquired by Byrd Oil Corp., the parent company.

McConnell now, according to D. H. Byrd, will operate only as a drilling company.

Properties in the transfer include a recent gas discovery on a 1,760-acre block in San Juan County, New Mexico; a 12,000-acre block in the Gause area of Milam County, Texas, on which a dual gas discovery has been completed; and 160 acres in a drilling unit, plus royalty and other lease holdings, in McCone County, Montana.

Sulfur-Tax Case to Open

AUSTIN.—The legality of the present law taxing sulfur produced from natural gas will be argued in a District Court here this week.

Phillips Chemical Co. and other producers of sulfur from sour gas have paid under protest over $100,000 in taxes on the product. They claim the $1.40 a ton tax is levied only on regular brimstone deposits and not on a natural-gas byproduct.

State Atty. Gen. John Ben Shepperd has reported that this year's commercial production of sulfur from gas will be four times greater than 1952.

CANADA

Price Cut is Predicted

TORONTO.—J. R. White, president of Imperial Oil, Ltd., stated last week that product prices in British Columbia would probably be reduced slightly when Trans-Mountain crude became available to local refineries.

The price cut would not be much, he warned, for the differential, discounting pipe line tariffs would amount to only 2 cents per gallon for crude laid down in the Vancouver area. Product prices will be determined by several factors including the delivered price of Alberta crude, and the costs of larger scale refining in expanded West Coast refineries.

Imperial has completed a modernization and expansion program which brought the Ioco refinery, near Vancouver to 22,500 bbl. per day and included the first catalytic cracking unit in the province. Shell Oil Co. of Canada, Ltd., and Standard Oil Co. of British Columbia, Ltd., are also modernizing and expanding their local refineries, and British American Oil Co., Ltd., is understood to be planning to build a modern refinery in the Vancouver area.

Alberta Plans Land Sales

EDMONTON. — The Alberta Government plans two land sales next month covering the mineral rights on 454,640 acres.

The first sale, which will be handled by the Calgary mining recorder October 7, will include 11 tracts covering 24,640 acres in the Medicine Hat, Many Berries, and Pincher Creek areas. The largest tract, 12,160 acres, is located 10 miles east of Many Berries gas field.

The director of mineral rights will hold the other sale here October 10 involving seven tracts totaling 430,000 acres. This acreage is located 65 miles northwest of the Peace River Township. It is a solid block running 36 miles north and south and 30 miles east and west.

Ioco Refinery on Stream

IOCO, B. C.—Imperial Oil, Ltd., has officially opened its newly expanded and modernized Ioco, B. C. refinery. Capacity has been doubled and the refinery now boasts British Columbia's first catalytic cracking unit.

A new crude unit rated at 22,500-bbl. per day is in operation, together with a vacuum pipe still capable of charging 9,100 bbl. per day of topped crude. Heart of the revamped plant is the 7,600-bbl. per day fluid catalytic cracking unit, the first on Canada's west coast. Included in the program are new gas-recovery and treating facilities.

The new process units will largely replace existing facilities at Ioco, and dismantling of the 12,000-bbl. per day crude unit and other older processing facilities is under way. The refinery continued in operation throughout the 18-month construction program, and since October 1952 has charged an average of about 5,000 bbl. per day of Alberta crude, brought in by tank car to supplement California stocks.

On completion of the Trans Mountain Pipe Line, the refinery will convert 100 per cent to processing Canadian crude, according to E. K. Lewis, superintendent. The $13 million construction project was handled by Canadian Bechtel, Ltd.

Saskatchewan Leases Sold

REGINA, Sask. — Bids totaling $2,531,074.59 plus regular royalties have been accepted for oil and gas leases in eight quarter sections of land in the Fosterton and Success fields. It was the first public sale of its kind in Saskatchewan.

Bids were received on 12 parcels of land, 6 in Fosterton field and 2 in Success field. The other four parcels were in the Cantuar field but were not sold as bids were considered to be too much below their real value.

Companies successful in bidding were Nuco Petroleums, Ltd., Edmonton; Socony-Vacuum Exploration, Ltd., Calgary; and Sohio Petroleum Co., Regina.

Alberta Production Boosted

EDMONTON, Alta.—Crude-oil production in Alberta in the first half of 1953 showed a 27.58 per cent increase over production in the first six months of 1952, according to figures issued recently by the provincial bureau of statistics.

Total production to the end of June this year was 31,721,834 bbl., with sales valued at $74,798,220, compared with 24,863,839 bbl. and sales of $60,-162,805 in the first half of 1953.

Natural-gas production for the six-month period this year totalled 55,-733,533,000 cubic feet, an increase of 14.92 per cent over the 48,496,300,000 cubic feet in the first half of last year.

Production of refined petroleum products in the province reached 329,-867,796 gallons and gross sales totalled $50,580,787, compared with production of 327,648,983 and sales totalling $48,760,452 to the end of June, 1952.

MID-CONTINENT

Wildcat Has Showing

Well indicates Northeast Anadarko basin discovery

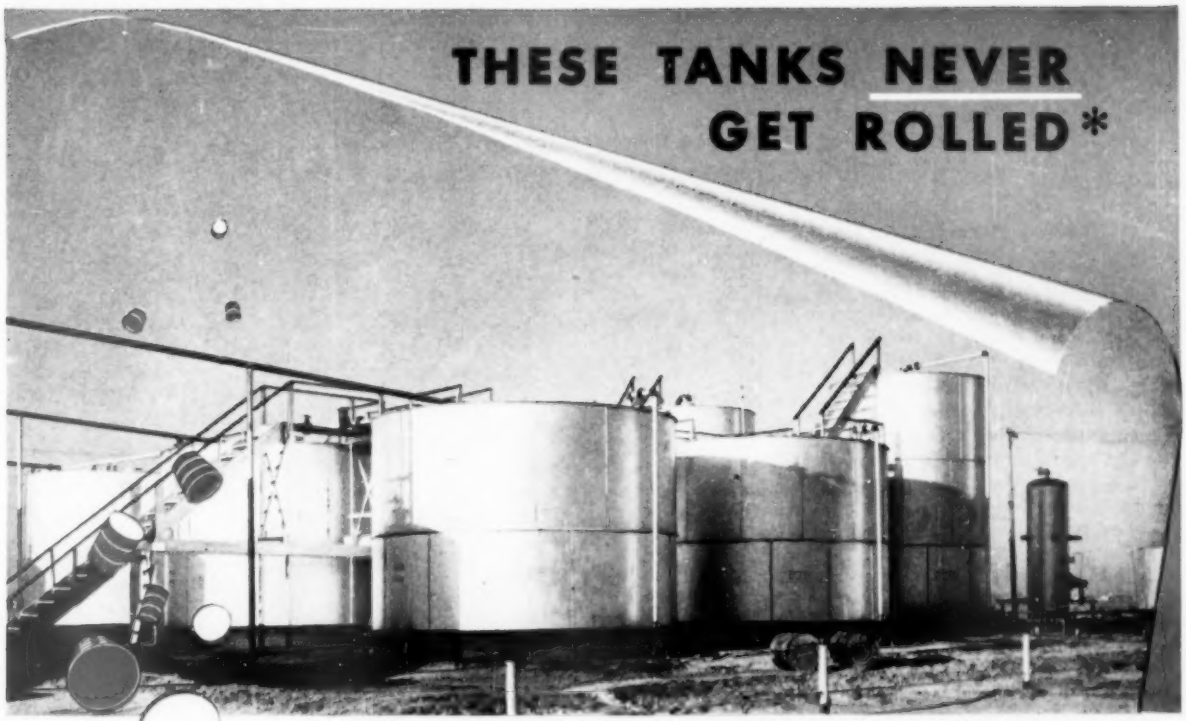
ENID, Okla.—Testing a truly rank wildcat in Woods County, near the Kansas line in northwestern Oklahoma, has resulted in the best showings to date in that section of the state.

Champlin Refining Co. 1 Dyer, NE NE SW 17-29n-17w, recovered 1,550 ft. of 40.6°-gravity oil and 285 ft. of salt water on a drill-stem test at 5,882-90 ft. in the Simpson sand. Up the hole, at 5,862-75 ft., in the Simpson dolomite the indicated discovery flowed gas at the rate of 9,000 M.c.f. per day with a small show of distillate. Another gas-distillate pay was indicated for the Simpson dolomite by a test at 5,830-55 ft. when the well flowed at the rate of 7,120 M.c.f. per day.

A third gas-distillate pay was found in the Arbuckle on drill-stem test at 6,038-55 ft. At the end of 5 minutes on the 45-minute test the gas volume was gaged at 4,075 M.c.f. per day, at the 8-minute interval 4,900 M.c.f., 5,690 M.c.f. at the 10-minute interval, 6,160 M.c.f. at the 20-minute interval, 6,300 M.c.f. at the 30-minute interval, and 7,000 M.c.f. at the 45-minute interval. Flow pressure ran from 1,155 to 1,325 psi. Shut-in pressure was 2,340 psi. Recovery was 5 ft. of distillate.

Nearest Kansas production is 12 miles to the northeast at Aetna gas pool in Barber County. Nearest oil production in Oklahoma is in Major County's Ringwood pool, 60 miles to the southeast. The indicated discovery is located on the essentially production-less northeastern rim of the Anadarko basin.

This indicated success, coupled with the recent completion of Union of California's Grant County Simpson oil discovery about 65 miles to the east, puts new emphasis on the potentialities of this section of the huge Anadarko basin, the Mid-Continent's most active rank wildcatting area.



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DEHYDRATING AND DESALTING CHEMICALS

Biggest Inch Eyed

Government studying feasibility of 36-in. products line from Midwest and Gulf to East Coast as defense insurance

Bertram F. Linz

WASHINGTON. — Feasibility of what would be the world's biggest products pipe line, a 36-in. system originating at widely divergent points in the Midwest and on the Gulf Coast and running to the eastern seaboard, is being studied by government officials.

Designed purely as a defense measure, the proposed line would assure a constant supply of as much as 750,000 Bbl. daily of products to the East Coast in the event of an emergency. It would release tankers that would be vitally essential to transport military oil products to various areas of the world in the event of war.

Preferably, the line would be built by the industry, probably with some government financial assistance, but if the industry could not undertake the project the government itself might build it. The Department of Justice will be asked to approve a study by the National Petroleum Council which 2 years ago shied away from such an investigation on the ground it was beyond its scope of authority since it would involve recommendations for handling competitive problems.

The problem of wartime oil transportation has been under study for many months and has been the subject of consideration by the National Security Council, concerned over warnings by the military that the ability to move large volumes of oil to any possible theatre of operations immediately upon the outbreak of war might be a decisive factor in achieving victory.

The seriousness with which the administration views the situation, despite the uneasy truce that has been secured in Korea, is evidenced by recent statements by President Eisenhower, Secretary of the Treasury George M. Humphrey and Mobilization Director Arthur S. Flemming of the need for maintaining a vigorous mobilization program and warning that the next war will come with an aerial Pearl Harbor of which we will have no advance notice.

Past recalled . . . A number of factors are involved in the decision to give serious study to the East Coast supply situation in time of war.

The near-starvation of the East Coast —with approximately one-third of the nation's industrial activity—in the early days of the last war figures in all military planning. A large part of the fleet engaged in coastwise oil transportation was sunk by German submarines.

It is also remembered that plans for construction of the "Big Inch" pipe line developed and perfected by the industry itself were turned down by the government before Pearl Harbor because materials were scarce. The line later had to be built by the government when materials were even scarcer.

Little progress has been made on the program for construction of new high-capacity, high-speed tankers. A proposal by the Commerce Department to encourage construction of new vessels by means of a trade-in arrangement for existing tankers, which would be put into a reserve oiler fleet, failed to secure the approval of the Comptroller General and no new proposals have yet been formulated.

Tanker construction . . . The question of tanker construction is expected to come up during the course of a study of maritime subsidies by a Senate commerce subcommittee which will open with hearings in San Francisco October 21.

Every possible way of insuring a safe wartime oil supply for the East Coast is being explored, including the possibility of reconverting one of the "Big Inch" pipe lines if Texas Eastern Transmission Corp. could supply its customers from other existing lines or build a new project.

In Shreveport last week, R. H. Hargrove, president of Texas Eastern Transmission Corp., said a study of conversion of the line is being made but has not yet progressed to the point that any details are available.

Mobilization officials also are studying a proposal of the American Pipe Line Co., apparently a substitute for the United States Pipe Line Co. project, to build a big products line from Texas to New Jersey at a cost of approximately $156,000,000, with the government to provide $60,000,000 and grant 100 per cent accelerated amortization on the remainder.

In view of the experience in the last war and the further fact that Russia today reportedly has the largest submarine fleet in the world, the planning for domestic oil supply in time of war now is based on overland movement, with all available tankers devoted to overseas transportation.

It would still be necessary to depend upon imported oil for much of the military's needs and upon foreign flag tankers for much of the transportation.

By building an overland transportation system geared to the needs of war before the emergency necessity for such a system arises, the difficulties encountered in 1942 would not again arise and the allied tanker fleets could be devoted to military service.

Refining Growth Seen

Foreign capacity to exceed 6,300,000 bbl. by end of 1955, a 40 per cent gain over 1951, PAD study shows

WASHINGTON. — Foreign refining capacity, exclusive of Abadan and the Communist orbit, will reach 6,345,000 bbl. daily by the end of 1955, a 40 per cent increase over the 4,540,000-bbl. daily capacity at the end of 1951, it was predicted by the Petroleum Administration for Defense last week.

These figures represent the results of a survey of foreign refining capacity in which refiners throughout the Free World supplied PAD with capacity figures on all projects on which work actually has begun.

The figures were based on the end of 1951 because it was during that year that the Abadan refinery went out of operation.

Increase in capacities . . . The survey showed that refineries in the Far East will have increased their 1951 capacity by 77 per cent over the following 4 years. European capacity will be increased by 47 per cent but Western Hemisphere capacity outside the United States will go up only 28 per cent.

Significant increases in the installation of modern refining processes such as catalytic cracking and even catalytic reforming are planned by foreign refiners, it was found. In the Western

Hemisphere, because of projected increases in Canada and Mexico, refiners plan to use catalytic cracking on what will amount to 10 per cent of their total crude runs. In the Eastern Hemisphere, with the greatest advance to be registered in Europe, refiners plan catalytic cracking for 11 per cent. Currently both groups are cracking 7 per cent.

Facilities for thermal cracking and reforming also will be expanded over the next several years, the study disclosed. Because there are planned conversions to the more efficient catalytic processes, however, the percentage of crude that will be thermally cracked or reformed is expected to drop.

More refineries . . . The report showed that the number of countries with refineries will increase to 51 by the end of 1955 compared with 46 in 1951. There will be 116 refineries in Free Europe against 104 and 50 of them, against 39, will be 9,000-bbl. daily capacity or over. Africa and the Middle and Near East will have 20 refineries against 13 with 12, against 9, with the 9,000 or more barrels capacity. India, Australia, and the Far East will have 39 refineries against 32, with 19 against 6 able to run 9,000 bbl. or more, making the total for the Eastern Hemisphere 175 against 149, and large plants, 81 against 54.

Canada and Mexico will show an increase of five refineries to a total of 46 by the end of 1955, but an increase of 7 to 26 in the number of plants for 9,000 bbl. or more. The Caribbean area, including Colombia and Venezuela, will show an increase of only two refineries to 29 and no increase in the 13 large ones. The balance of the Western Hemisphere will add four refineries to a total of 36, and a corresponding increase to 11 in the number of large plants, making a total for the hemipshere of 111 plants against 100 in 1951, and 50 plants with 9,000 bbl. or better capacity against 39.

The total of refineries outside of the United States and the Communist countries will increase from 249 in 1951 to 286 in 1955, and the number of refineries with 9,000 bbl. or better capacity will increase from 93 to 131, the figures showed.

Comparisons . . . Here are the figures on 1955 capacity of foreign refineries, compared with 1951 for crude capacity and 1952 for other capacities, shown by the PAD report in thousands of barrels daily:

Canada and Mexico: Crude capacity, 856 against 593; cat cracking, 186 against 107; thermal cracking and reforming, 159 against

WATCHING WASHINGTON

Bertram F. Linz

Refinery Capacity Defended

The Petroleum Administration for Defense sees no validity in the charge of independent refiners that the mobilization expansion program will result in an excess of refinery capacity which will have the effect of squeezing them out of business.

So far, at least, PAD statistics indicate, unused refinery capacity gives no indication of becoming burdensome. Since 1937 there have been only 8 years, including 1953, in which idle capacity was less than 15 per cent, while in 6 years it exceeded 20 per cent.

For this year, the PAD program division estimates crude runs will rise to 8,099,000 bbl. daily by the year end, averaging 7,054,000 bbl. daily for 1953 as a whole. The average refinery crude capacity will be 7,869,000 bbl. daily, with 815,000 bbl. or 10.4 per cent unused. In 1952, the unused capacity was 816,000 bbl. or 10.9 per cent, and as recently as 1950 it was 1,091,000 bbl. or 16 per cent.

Historically, the program division pointed out, there always has been an excess of refinery capacity.

However, PAD figures indicate, year-end stocks, with one exception, can be expected to be much heavier than at the close of 1952.

Present indications are that gasoline stocks will reach 142,000,000 bbl. by the end of the year, against 136,000,000 bbl. last year, with kerosine stocks at 29,000,000 bbl. against 27,500,000 bbl.; distillate, 108,000,000 bbl. against 98,900,000 bbl.; residual, the exception, 47,000,000 bbl. against 48,700,000 bbl.; other products, 99,000,000 bbl. against 90,800,000 bbl., and crude, 280,000,000 bbl. against 271,900,000 bbl.

Important Decisions Pending

The Supreme Court will meet for its 1953-54 session next month with several important oil and gas cases due to come before it by the end of the year.

Probably the three most important cases in the court or expected to be submitted deal with the Federal Power Commission's jurisdiction over the arm's-length sale of natural gas by independent producers and gatherers, the Texas gas-gathering tax and the validity of unit clauses in long-term leases.

The commission's authority is involved in the case of the Phillips Petroleum Co. The controversy over the control of producers and gatherers has been of long standing, but it now will be settled finally, barring future action by Congress.

The Texas tax on the "gathering" of natural gas was held valid by the state Supreme Court and has been appealed by pipe-line companies on the ground the tax is unconstitutional.

The legality of unit or pooling clauses which are more or less standard in long-term leases used in the Rocky Mountain, Mid-Continent, and Southwest oil areas is involved in a decision by the Utah District Court which held them invalid in a case where a number of oil companies attempted to set up a field-wide unitization agreement for the Roosevelt pool.

States Eye U. S. Lands

Administration suggestions that some of the federally owned lands might be transferred to the states to be turned over to private ownership or development are being taken very seriously in the public land states.

From the states' point of view, such a policy would go far toward solving their financial problem, particularly in states where there is extensive oil development on the public lands.

Under the present policy of the Government, what the states get out of the federally owned lands and resources depends on the generosity of Congress and the administration.

In the case of Nevada, where the Government owns a fraction less than 85 per cent of the state's land area, these payments run about $700,000 a year or about a fourth of what state officials figure they could collect if the federal lands were state or privately owned.

The whole problem is due to be canvassed at a meeting late this month of business representatives from 11 western states in which the Government holds 35 per cent or more of the land area. The meeting may come up with strong representations that action be taken.

158; cat reforming, 25 against 7; polymerization production, 12 against 8.

Caribbean area: Crude, 1,515 against 1,285; cat cracking, 67 against 53; thermal, 667 against 580; cat reforming, 10 against none; polymerization, 12 against 8.

Balance Western Hemisphere: Crude, 375 against 272; cat cracking, 27 against none; thermal, 159 against 78; cat reforming, none; polymerization, 6 against none.

Free Europe: Crude, 2,181 against 1,490; cat cracking, 295 against 140; thermal, 294 against 257; cat reforming, 56 against 1; polymerization, 15 against 9.

Africa, Middle and Near East: Crude, 780 against 541; cat cracking, 37 against 26; thermal, 133 against 100; cat reforming, 24 against none; polymerization, 3 against 2.

India, Australia, Far East: Crude, 639 against 359; cat cracking, 71 against none; thermal, 80 against 77; cat reforming, 12 against 2; polymerization, 3 against 1.

Total foreign: Crude, 6,346 against 4,540; cat cracking, 683 against 326; thermal, 1,492 against 1,250; cat reforming, 127 against 10; polymerization, 41 against 22.

The figures show increases of 40 per cent in crude capacity, 110 per cent in cat cracking, 20 per cent in thermal, 1,170 per cent in cat reforming and 87 per cent in polymerization.

Drilling Goals Set

ODM sets need at 49,000 wells in '54, more in '55

WASHINGTON.—Drilling programs for 49,000 oil wells in 1954 and 50,000 in 1955 have been suggested to the Petroleum Administration for Defense by the Office of Defense Mobilization.

The ODM recommendations apparently resulted from study of the programs outlined by PAD last July, in which no goal was set for drilling because present estimates of productive capacity are substantially in excess of current requirements and it appears that the materials supply situation will permit the industry to drill sufficient wells to keep pace with growing demands and continue to maintain a reserve productive capacity roughly in line with the current reserve.

Following disclosure of the targets set by ODM, officials of the oil agency pointed out that a projection of present drilling rates indicates that about 48,500 wells will be drilled this year, and that logically up to an additional thousand could be counted on for 1954 and again in 1955. Thus, they said, the industry's own normal expansion of activities will result in even more wells than ODM calls for.

Too low, I.P.A.A. says . . . On the other hand, the ODM figures are considered too low by Russell B. Brown, general counsel for the Independent Petroleum Association of America.

The I.P.A.A. believes, he said, the targets for drilling should be 52,000 wells this year, 55,000 in 1954, and 58,000 in 1952.

ROCKY MOUNTAIN

AMERADA'S 1 Logan, in the background, which has discovered the first Heath oil in North Dakota, and the Fryburg test, foreground, which has indicated commercial oil in the Mississippian-Madison.

New Basin Formation

Amerada discovers thick, high-gravity oil in Heath

WILLISTON, N. D.—A new producing formation has been indicated for the North Dakota portion of the Williston basin.

Amerada Petroleum Corp. 1 W. E. Logan, a northwest offset to Amerada's indicated Mississippian - Madison discovery in the Fryburg area of Billings County, recovered more than 1,200 ft. of black oil from the Mississippian-Heath on a drill-stem test at 8,204-44 ft.

The Heath is the youngest formation of the Mississippian-Big Snowy group which overlies the Madison group in the central portion of the Williston basin.

The 1 Logan was the first well in North Dakota to recover oil from the Heath. No Heath oil has been found in the Williston basin producing area of eastern Montana along the Cedar Creek anticline, but two wells in East Poplar field, Roosevelt County, now producing from the Madison, recovered Heath oil on drill-stem tests.

On the drill-stem test of Amerada 1 Logan, SE SW 4-139n-100w, gas hit the surface in 2 hours and 50 minutes. Recovery was 2,000 ft. of slightly oil and gas-cut water cushion, 1,220 ft. of black oil, 440 ft. of heavily oil and gas-cut mud (estimated 60 per cent oil), and 30 ft. of oil-cut drilling mud. The oil is very thick and when unloaded it "stacked up on the derrick floor."

The crude was analyzed as 49°-gravity oil with a high paraffin content.

Operating Agreement Made

BILLINGS, Mont. — An agreement has been reached between Northern Pacific Railway Co. and Gulf Oil Corp. covering exploratory operations in the Trotters area of Billings and Golden Valley counties, North Dakota.

This area lies about midway between the recent important discovery made by Sun Oil Co. and Phillips Petroleum Co. in Richland County, Montana, and the one made by Amerada Petroleum Corp. and Northern Pacific in the Fryburg area of Billings County, North Dakota.

Gulf and Northern Pacific will share drilling costs for the deep test well to be commenced immediately in NE SW 24-143n-103w, Golden Valley County.

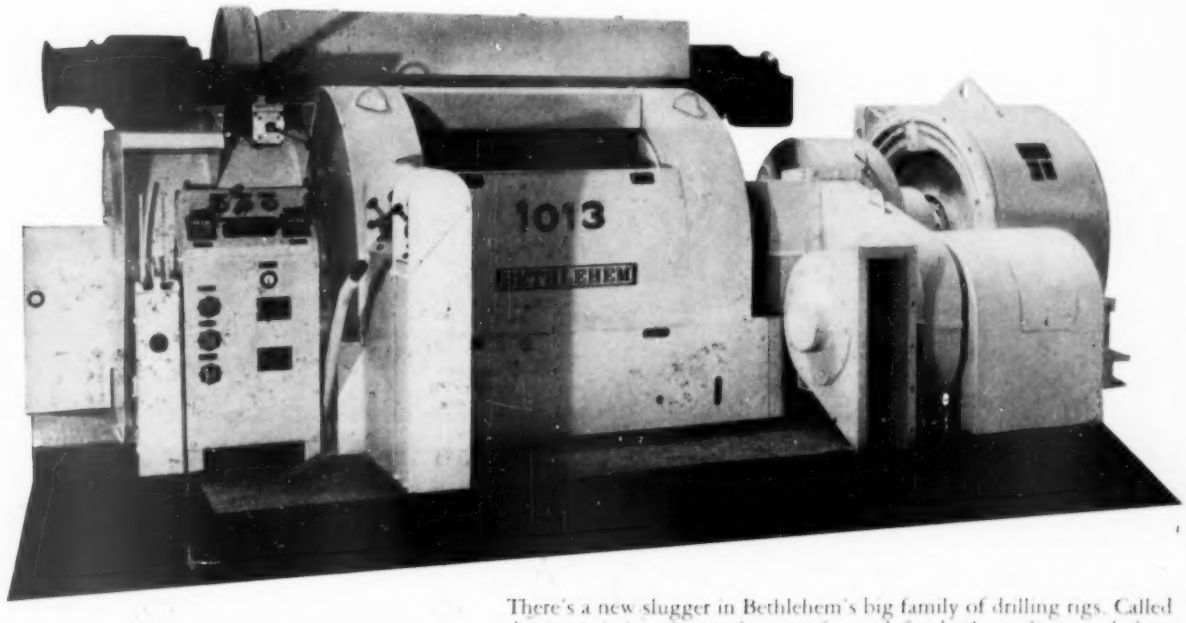
Monument to Mark Oil Find

WILLISTON, N. D.—Dedication of a monument commemorating discovery of oil in North Dakota will highlight a 2-day celebration here October 24-25.

The dedicatory address will be made October 25 by A. Jacobsen, president of Amerada Petroleum Corp. Gov. Norman Brunsdale will unveil the monument located at the discovery well on the Clarence Iverson farm. The well, the first in North Dakota and the Williston basin, was brought in by Amerada April 4, 1951.

THE BETHLEHEM 1013

A POWERFUL NEW RIG FOR MEDIUM AND DEEP DRILLING



There's a new slugger in Bethlehem's big family of drilling rigs. Called the 1013, it is a heavy-duty outfit used for both medium and deep drilling jobs.

The 1013 has power to burn, and it's a sweet-running outfit. Smooth, easy to operate. All controls at the driller's fingertips. No other rig of its size has ever been as simple to handle.

It permits wide latitude in the choice of drive, being available for mechanical, electric, or hydraulic coupling or hydraulic torque-converter, whichever may be desired. It also allows complete freedom in the selection of engines and engine combinations.

This big rig has extra-capacity clutches, extra-heavy shafts and brakes. Yet despite its rugged members, it is compact . . . easy to move. Because of an unusual arrangement of transmission speeds on the No. 1 engine drive group, the drawworks need not be split to keep within prescribed road limits. Moreover, this type of arrangement makes the rig especially adaptable to electric motor or hydraulic torque-converter application.

Why not see the 1013 and study its many features? A Bethlehem engineer will be glad to go over them with you, point by point.

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LATIN AMERICA

Labor Costs Up

Venezuelan workers granted pay increases of 10 per cent in new "collective" contract which grants other benefits

A NEW "collective contract" granting the Venezuelan oil industry's 45,000 workers wage increases amounting to more than 10 per cent was signed in Caracas on September 12.

The new contract was hailed by the Minister of Labor as "the most advanced" achieved in Venezuela.

The wage increases granted are less than the across-the-board 15 per cent labor was asking. Daily workers earning less than Bs. 22 ($6.60) base pay will get a raise of Bs. 2.25 (67½ cents). Employes paid on a monthly basis will get 10 per cent raises, between a minimum of Bs. 70 ($21) and a maximum of Bs. 200 ($60).

Compromise . . . A compromise was effected on the much-discussed question of the employment of contractors' services. The union had demanded complete elimination of contractors and third parties, on the ground that they "do not always" comply with the full provisions of the law with respect to their obligations to their workers. The companies maintained that the use of contract services is both necessary and desirable, and won their point, guaranteeing they will maintain strict control over contractors and subcontractors' payrolls.

The companies had argued for the establishment of moderate charges for medical service, on the grounds that this would check some of the abuses to which the completely gratuitous system is subject. They did not make their point, however, and the service remains free.

Other gains by the workers included:

. . . Some job reclassification in favor of employes.

. . . Increased housing allowances where housing is not furnished.

. . . Death indemnities raised from $1,000 to $4,500 and to $7,500 for incapacity.

. . . Additional vacation time based on seniority, 2 days for 5 to 10 years' service and 3 days for more.

. . . Additions to the list of subsidized staple items to be carried in all company commissaries.

. . . Improvement of living conditions in geological and geophysical field camps.

Early reports had indicated that the workers would push for a bigger share in company profits, but nothing new on this has been announced. Presumably oil workers will continue to receive a year-end bonus equal to 16⅔ per cent of their annual earnings.

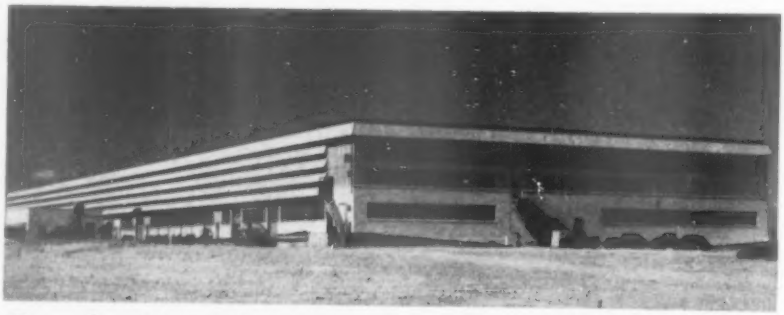
Benefits of the new deal will be extended to all oil workers, regardless of their affiliation with the organization which sponsored the contract just signed. The organization claims to represent 90 per cent of the unionized oil workers. This measure would seem to take the wind out of the sails of another syndicate which had also worked up a series of proposals but submitted them to the Ministry of Labor rather than direct to the companies.

The terms of the new contract are to be in force for the next 3 years. It is too early to estimate just what the cost to the companies will be. The last such agreement increased the price of labor to the companies by an estimated 12-15 per cent.

Creole Production Declines

Operated production of Creole Petroleum Corp. during July showed another decline of 23,650 bbl. daily.

Output averaged 704,295 bbl. daily, of which 569,279 bbl. daily came from the Lake Maracaibo area, 6,781 bbl. daily from other Western Venezuela fields, and 128,235 bbl. daily from Eastern Venezuela. Net production plus purchased royalty oil averaged 763,453 bbl. daily, down 22,616 bbl. daily.



Creole Warehouse at Amuay Bay . . .

. . . Helps Supply Venezuela Operation

These interior and exterior views of a shops-and-warehouse building of Creole Petroleum Corp. at Amuay Bay on the Paraguana Peninsula in western Venezuela give an indication of the tremendous supply effort involved in the larger foreign oil operations. In remote areas, ordering months ahead is necessary, and thousands of separate items are stocked to meet emergencies. In addition to operating supplies and equipment, material for such associated activities as housing, schools, hospitals, and commissaries also must be imported.

The average number of rigs operated by Creole during July was up slightly to 22.6. The company completed 13 wells during the month, 6 of them exploratory. Of the exploratory tests, two were oil producers, one in Quiriquire, and one in Maracaibo. The Maracaibo well had an initial production of 1,996 bbl. daily and a total depth of 7,321 ft.

Creole's runs during the month averaged 122,761 bbl. daily, including 38,186 bbl. daily at Caripito and 84,575 bbl. daily at Amuay.

Pemex Progress Told

Mexican oil company director says firm needs money more than it needs oil as he outlines accomplishments of year

THE accomplishments of Petroleos Mexicanos during the year ended September 1, including a record well-drilling program, the discovery of 10 producing structures, and further improvements in refining facilities, were outlined by Antonio J. Bermudez, director-general, in Mexico City.

The summary of Pemex's activities was contained in a report prepared by Bermudez for the use of President Adolfo Ruiz Cortines in the chief executive's annual "state of the nation" speech to the opening session of the Mexican Congress September 1.

The most pressing need of the government oil company is money more than it is oil, Bermudez asserted. "The development and progress of the Mexican petroleum industry are founded principally on the amount of its income," he said. During the 12 months period, total income of the government company was 1,918,628,210 pesos (about $223,000,000). Of this taxes, and other charges amounted to 527,594,488 pesos ($61,300,000).

Drilling . . . Pemex completed a total of 368 wells and drilled 1,410,000 ft. during the year's period. These figures, Bermudez said, had been exceeded only during the 1923-27 boom period of the Mexican oil industry. Of the total wells drilled, 114 were exploratory tests, and the 254 were field wells.

Pemex is now using 19 seismic, four gravimetric, and one electrical crew in its geophysical work. Geophysical or geological work was carried in Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas states, in the Tampico Zone, the north and central regions of Veracruz, parts of Oaxaca and Pueblo, in Chiapas and Tabasco, and also in Campeche and Yucatan. Gravimetric work of the Sebastian Vizcafno desert in the southern territory of Baja California was completed.

Bermudez said Pemex has 92 drilling rigs working on exploration and development and 27 rigs on repair jobs.

New structures . . . The 10 new producing structures discovered during the last 12 months were Rio Bravo in Tamaulipas, and Volador, Mozutla, Ocotepec, Xacotla, Horcon, Santa Agueda, Angostura, Los Soldados, and Cabo Rojo in the state of Veracruz. In addition, new producing horizons were found in Jose Colomo field in Tabasco and Tonala in Veracruz.

The Pemex head said production in the 12 months period averaged 216,500 bbl. daily with many wells shut back for lack of export markets. Potential output was placed at 250,000 bbl. daily. Available production from the northeastern gas fields along the United States-Mexican border was estimated at a possible 450,000,000 cu. ft. daily over 20 years.

Drilling in some of the older fields of the Panuco region has been cut back in view of the satisfactory results in new areas between Papantla and Tuxpan and at Angostura to the south of the port of Veracruz. Bermudez said drilling will be continued in Poza Rica, Mecatepec, Escolin, Aleman, and Avila Camacho fields, "not only in search of extensions but also to sustain production under rigid technical control to permit maximum recovery."

Refining . . . Turning to refining and marketing, Bermudez said that Pemex has the eventual goal of exporting only refined products and those in excess of the country's needs. During the 12 months' period, Pemex refineries processed 69,144,000 bbl. of crude, or about 190,000 bbl. daily, a 10 per cent increase over the previous 12 months.

Several major pipe-line and refinery projects are being carried out by the government company. Plans are under consideration for increasing capacity of the Atzcapotzalco refinery in Mexico City to 80,000 bbl. daily. While a new line is planned to bring crude from Poza Rica, for the time being a 19-mile loop is being laid on the existing line to increase throughput to 64,000 bbl. daily. At Poza Rica, separators have been expanded, and new absorption and dehydration plants are being built. Compressors to maintain field pressure are being installed, and other facilities added.

Plans call for increasing capacity of the Salamanca refinery from 30,000 to 40,000 bbl. daily, and for boosting throughput of the Poza Rica-Salamanca line by pump-station improvements. Work on the lubricating-oil plant at Salamanca is on schedule with first operations expected in mid-1954.

Extensive changes are being made in the Ciudad Madero refinery, consisting initially with the erection of a desulfurization plant and to continue with a catalytic cracking unit. The Minatitlan refinery is undergoing a complete rehabilitation, including the construction of a catalytic cracking unit. The capacity of the refinery at Reynosa has been increased from 4,000 to 7,000 bbl. daily, and further improvements are being made.

FAR EAST

Plant Work Pushed

1,000 busy at Bombay on new Burmah-Shell refinery

CONSTRUCTION work is now well under way on the new 40,000-bbl. daily Burmah-Shell refinery near Bombay, India.

A labor force of nearly 1,000 men is already at work on the 450-acre site, and this number will be increased substantially as construction reaches its peak. The refinery is scheduled for completion in early 1955.

The project costing approximately $56,000,000 is being carried out by Burmah-Shell Refineries, Ltd., jointly owned by the Royal Dutch-Shell Group and Burmah Oil Co., Ltd. It is the largest of three completely new refineries slated for India. Standard-Vacuum Oil Co. has a 25,000-bbl. daily refinery under construction near Bombay, while Caltex is scheduled to begin work in 1955 on a new plant on the east coast of India.

The new Burmah-Shell refinery will use Middle East crude. Design work is being done by Lummus Co. and Shell, and the main erection work has been contracted to Lummus and its subsidiaries. In charge of the undertaking for Burmah-Shell is H. J. Trow.

Process units . . . Main facilities of the new refinery will comprise crude distillation, vacuum distillation, catalytic cracking, gas separation, product treating, and asphalt manufacture and packing.

Sea water will be used for cooling.

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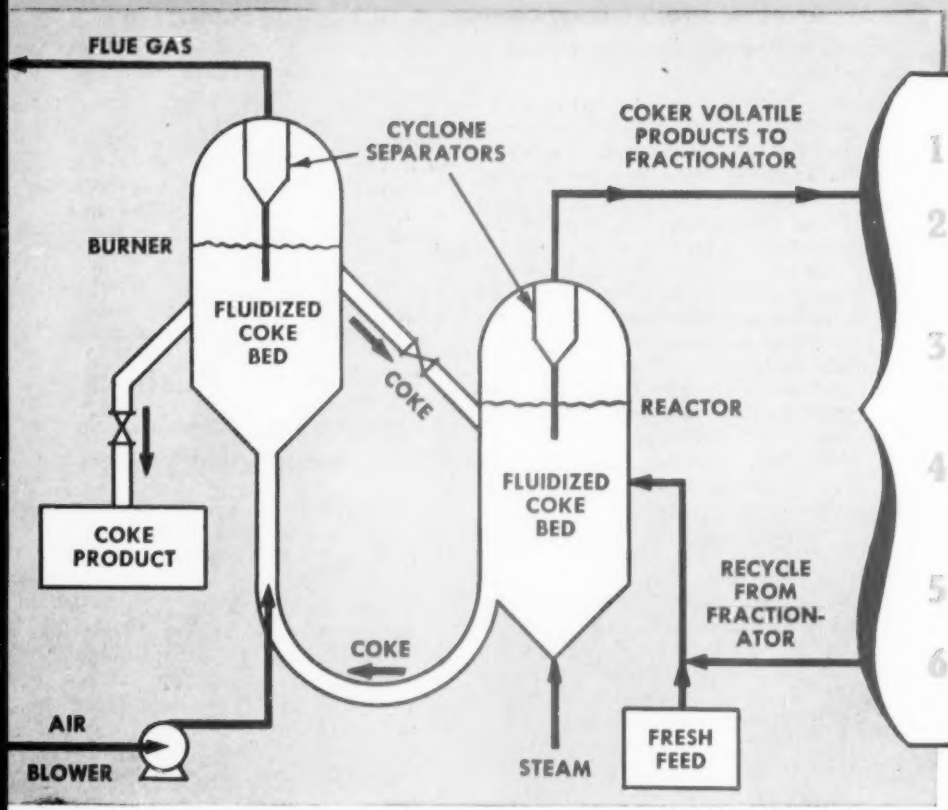

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South of Tromboy Island, a small cooling water pump station will be erected in the sea. Pumps will deliver the water through pipe lines to a basin in the southern part of the refinery area from which the main cooling water pump station will take suction. The pumps located in the sea station will be driven by electric motors. To safeguard against electricity failures, a steam-driven generator will be installed in the main refinery pump station, while the main pumps will be turbine driven.

Electric power will be taken from local companies, and a boiler house is being built to supply steam. Other general facilities at the refinery include offices, laboratory, fire station, workshops, warehouses, change in washrooms, canteens, etc.

The Bombay Port Trust is building a new marine terminal at Butcher Island, 3 miles from the refinery, and is connecting it with Tromboy by submarine pipe lines. Crude from the refinery will be pumped through these lines from Butcher Island; part of the refined products will be delivered through other lines along the same route for loading into tankers and for distribution to other parts of India. Some products will be pumped direct to the distributing company's installations in the Bombay area, and the remainder will be carried by road and rail transportation to various bulk depots.

Prices Defended

Indian lower house is told to shun Iranian method

A MEMBER of the Indian cabinet told the parliament in New Delhi recently that the government has "no intention of going the Mossadegh way" in its dealings with the domestic oil industry.

The statement was made by the deputy minister for works, supply, and production during questioning by members of the lower house on profits made by Assam Oil Co. Assam, a subsidiary of Burmah Oil Co., Ltd., a small integrated company operating in northeast India and providing the only crude production and refining in the country.

The deputy minister, S. N. Buragehain, agreed that the prices of gasoline and kerosine in Assam were the highest in India but said the basis of the price of gasoline, whether produced in the country or imported, was the American Gulf price. He added that the government could not go into certain elements that made up the world price structure.

Buragehain previously had told the lower house that the profits of the Assam company worked out at 100 to 300 per cent. These profits, he said, have been high in the last few years, but "it is the contention of the company that account should be taken of undistributed profits plowed back into the business in the early years, that the profits accrued to the holding company, Burmah Oil Co., Ltd., and that the company's final profits are quite moderate." "They also say," he said, "that the holding company spends large amounts for exploratory work on behalf of the Assam company, and that this should not be ignored."

Dependence on imports . . . The minister for works, supply, and production, Sargar Swaran Singh, pointed out that India depends upon imports for its petroleum requirements and that the production of the Assam Oil Co. meets only a small per cent of its needs.

The principal development in the oil industry in India is in the field of refinery construction. Burmah-Shell and Standard-Vacuum have new refineries of 25,000 and 40,000 bbl. respectively under construction near Bombay, and a third plant of 10,000 bbl. daily capacity is planned by Caltex on the east coast near Vizagapatam. All these projects are being undertaken under agreements with the Indian government which, among other terms, guarantee against nationalization for a 25-year period.

When these three refineries are in full operation, they will provide about 11,500 bbl. daily of gasoline and 9,500 bbl. daily of kerosine. A recent Indian government statement said this production would meet slightly more than 60 per cent of current demand for motor gasoline and little less than half that for kerosine.

EUROPE

NATO Line Bids Due

Work on 1,920-mile system scheduled for this autumn

WORK is scheduled to get under way this fall on the North Atlantic Treaty Alliance military pipe-line network in Europe.

The 1,920-mile system will consist of 4 to 10-in. lines and will cost approximately $100,000,000. It is considered to be the most extensive products system ever undertaken *(The Oil and Gas Journal, July 6, page 55)*.

A North Atlantic Council announcement in Paris said the NATO nations have been asked to invite bids for steel pipe totaling between 90,000 and 100,000 metric tons.

Purpose of the system is to supply aviation gasoline and other products to more than 100 air bases and other installations in western Europe. The United States is financing 40 per cent of the cost.

Most of the lines will be laid in the area from north Holland to the French-Swiss Alps. Details have not been disclosed since much of the information on the project is classified.

The plans call for contsruction of centrally situated tank farms which will be connected with air bases and forward areas by buried lines. The system is to be tied into the 8 to 10-in. U. S. Army line to be built from near St. Nazaire to the Metz area to supply United States forces *(The Oil and Gas Journal, August 17, page 89)*.

Foster Wheeler Francaise, French affiliate of Foster Wheeler Corp., has been given a contract of management in connection with the NATO products system, while the work itself will be carried out by each of the NATO nations. The project is now in the final planning stage under G. P. Jennings. It is planned to complete construction in two summers.

Greek Plant Offer Denied

Officials of four oil companies—Anglo-Iranian Oil Co., Ltd., Cities Service Co., Socony-Vacuum Oil Co., Inc., and Shell—denied last week that they had submitted proposals to the Greek Government to build a refinery in that country.

The Greek Government has issued a formal invitation for proposal to build the first Greek refinery, offering to make a loan for up to 50 per cent of the cost. Deadline for the proposals is November 15. *(The Oil and Gas Journal, September 14, page 98)*.

Earlier reports that 30 proposals had been received, including those from the four large oil companies, were attributed to the Greek Coordination Ministry in Athens.

There is a serious question whether a refinery in Greece, particularly of the 30,000-bbl.-daily capacity specified in the Greek Government's request for proposals, would be economically justified. Total Greek demand, including bunkers, is estimated this year at 1,178,000 metric tons or a little over 20,000 bbl. daily. Of this, some 500,000 tons or about 9,200 bbl. daily is heavy fuel oil.

PERSONALS

Leading Producer

Bruce in 14th year as Aladdin Petroleum head

GEORGE H. BRUCE this year completes his third decade of activity in the producing branch of the industry.

During these three decades he has progressed from a field engineer to president of Aladdin Petroleum Corp., Wichita, a leading independent company producing in Kanses and Oklahoma.

Bruce graduated from Stanford University, Palo Alto, Calif., in 1923. He was district production engineer of Cities Service Oil Co.'s eastern Kansas district from 1924-25 and in 1925-26 organized and served as manager of the Kansas Well Log Bureau.

He operated as an independent producer from 1926 through 1928. In 1929 he played a leading role in the organization of Aladdin Petroleum Corp. and was vice president and general manager of the firm until 1932, when he became president of Western Kansas Oil & Refining Co. He held this position until 1939. In that year Aladdin Petroleum and Western Kansas Oil & Refining were merged and he was named president of the revamped company—the position he still holds.

Bruce has been active in a number of oil industry associations and societies, particularly so in the Independent Petroleum Association of America. He currently is chairman of the I.P.A.A. price advisory committee. Before this, he served as a member of the executive committee, as vice president for eastern Kansas, and as a director.

N. T. Stover, formerly general sales manager of Ohio Oil Co., has been named vice president in charge of marketing.

Gyle Atterberry, tool pusher, has been transferred by R. W. Rine Drilling Co. from Buffalo, Okla., to Scott City, Kans.

S. H. Elliott of Standard Oil Co. (Ohio), Cleveland, has been appointed chairman of the nominating committee of the American Petroleum Institute's Division of Marketing.

David T. Jensen has been promoted to export sales manager of the eastern division of Tide Water Associated Oil Co.

H. G. Southworth, formerly general superintendent of plant operations in Gulf Oil Corp.'s marketing department, has been promoted to manager of operations for the Philadelphia division.

S. C. Bartlett has been appointed general manager of the domestic sales department of The Texas Co., succeeding **Walter Hochuli,** who is retiring because of ill health. **C. N. Brooks** is the new sales manager of Texaco's southern territory, succeeding **C. B. Barrett,** who recently was promoted to vice president in charge of sales.

Hiram M. Reed, Austin, Tex., independent oil operator, has been elected a director of South Texas Oil & Gas Co. Reed also is a director of the Texas Independent Producers and Royalty Owners Association.

B. R. Griffith, division petroleum engineer for Union Oil Co., and **Harold E. Nissen,** superintendent of Signal Oil & Gas Co.'s operations in northern Santa Barbara County, California, have been elected to 3-year terms as commissioners of District 3 of the California State Division of Oil and Gas. Griffith was reelected and Nissen succeeds **Gregg H. Reay.**

Harvey L. Hurley, vice president and general manager of Duke Petroleum Co., Ltd., Calgary, Alta., and **Robert J. Munn,** assistant general manager, have resigned, effective September 30. They plan to engage in their own business in the same field in which they have been while associated with Duke.

William H. Spomer, assistant comptroller of Pure Oil Co., Chicago, has been promoted to comptroller.

Dr. Frank G. Miller has been appointed head of the department of petroleum engineering at Stanford University. He replaces **Dr. Richard V. Hughes,** who recently joined Gulf Oil Corp. at Houston as technical assistant to the vice president. Dr. Miller had been an assistant supervising engineer in the petroleum and natural-gas branch of the U. S. Bureau of Mines at San Francisco.

John Warder, president of Cia. Mexicana de Petroleo El Aguila, S. A., and formerly on the staff of Asiatic Petroleum Corp. in New York, is leaving Mexico City to become manager of Cia. de Petroleo Shell de Colombia. **Allan Muir,** formerly with Shell Oil Co. in Caracas, Venezuela, will be the new president of El Aguila.

Henry E. Winter has been named manager of Creole Petroleum Corp.'s western division in Venezuela. He had been acting superintendent at Quiriquire in the company's eastern division since February and was made acting assistant district superintendent in August 1952.

Waymon L. Davis has been promoted by Chicago Corp. to production engineer and transferred from Bishop to Corpus Christi, Tex.

W. J. Quigles and **E. L. Rawlins** have been elected vice presidents of Union Producing Co., Shreveport, La. **C. A. McDowell** has been made general superintendent of production, and **T. W. Johnson** was named general superintendent of production engineering. Quigles joined a predecessor of Union in 1916 and had been superintendent of production since 1938. Rawlins joined Union in 1936 as superintendent of production engineering after being head of petroleum engineering for the U. S. Bureau of Mines at Bartlesville, Okla. McDowell has been with the United Gas organization, of which Union is a part, for more than 35 years and has been assistant general production superintendent since 1940. Johnson has 16 years with the firm, serving as assistant superintendent of production engineering since 1940.

PERSONALS

Jack M. Balderas, Jr., has joined Gulf Oil Corp. as a geologist at Durango, Colo.

R. E. Andrew has retired as president of Pohland Drilling Co., Inc., Midland, Tex., and is now located at Nevada, Mo.

Robert W. Brumberg, reservoir engineer for Ohio Oil Co., has been transferred from Grass Creek, Wyo., to the district office at Cody.

Roy Dickinson, district geologist, has been transferred by Lion Oil Co. from Abilene to Wichita Falls, Tex.

Wayland V. Jordan has returned to Continental Oil Co. as a production engineer at Houston after being discharged from the Army.

Jim C. Meacham, formerly assistant division exploration geologist for Humble Oil & Refining Co. at Corpus Christi, Tex., has been transferred to Houston as a staff geologist.

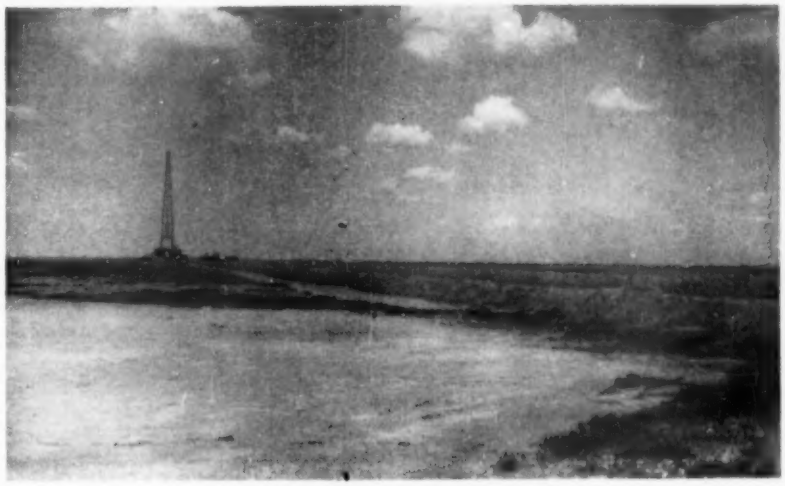
Eugene Cortinas has been transferred from Houston to Lafayette, La., as district geologist for Crown Central Petroleum Corp.

Arthur L. Brown has been transferred from Ventura, Calif., to Salt Lake City as division exploitation engineer for Shell Oil Co.

Royce Oualline, formerly with F. A. Callery, Inc., has joined Ada Oil Co., Houston, as Gulf Coast geologist.

Emerson Beakley, formerly a geologist with The Texas Co. in Bismarck, N. D., has joined Northern Natural Gas Co. in Bismarck.

Dr. Gustav Egloff, director of research for Universal Oil Products Co., Des Plaines, Ill., will leave September 28 for Japan to participate in the seventy-fifth anniversary celebration of the Chemical Society of Japan. Dr. Egloff is one of three foreign lecturers and the only American who will address the organization. He will speak in Tokyo on the Platforming process and chemicals from petroleum and at Osaka on catalytic reactions in oil refining. While en route to Japan, he will stop at Honolulu to speak on petrochemicals before the Hawaiian Section of the American Chemical Society. The other foreign guest lecturers are **Sir Robert Robinson,** professor of chemistry, Oxford University, and recent recipient of the Priestly Medal of the American Chemical Society, and **Dr. Walter Reppe** of Germany, noted for his work in acetylene chemistry.



Shell Drilling Wildcat on Narrow Peninsula

One of Shell Oil Co.'s newest wildcats is spotted on a mile-wide peninsula between the waters of the Gulf of Mexico and Matagorda Bay 21 miles from Matagorda, Tex. To reach location, the crew crosses a drawbridge spanning the Intracoastal Canal and then drives 7 miles over a specially built timber road on the beach. It took 360 tractor-hours to clear logs and driftwood from the beach to make a passable road. Project depth of the well is 7,500 ft.

A. J. Bollin has been promoted from senior chemist to assistant staff chemist in the service laboratory of Carter Oil Co., Tulsa.

John J. Jacob, Jr., president of Peoples Natural Gas Co., has been elected a director of Consolidated Natural Gas Co., the parent company. Jacob replaces **Edward M. Borger,** who resigned recently because of ill health.

J. F. Dobson, senior petroleum engineer, has been transferred by Sinclair Oil & Gas Co. from Ardmore, Okla., to Oklahoma City.

Walter D. Baird, Fort Worth, has resigned as vice president of Southern Geophysical Co. and has formed his own geophysical company. He joined Southern in 1947 and had been a vice president for 2 years.

C. R. Dodson has resigned as professor and head of the petroleum engineering department of the University of Southern California in order to devote full time with the consulting firm of Stanley, Stolz & Dodson, Los Angeles. Dodson was with Standard Oil Co. of California from 1936 to 1947. He had been at U.S.C. since then.

J. T. May has been transferred from Corpus Christi, Tex., to Denver as division production superintendent for the Rocky Mountain division of Chicago Corp.

Lewis Andrews, engineer for Exploration Drilling Co., has been transferred from Midland, Tex., to Tulsa.

Roland R. Reynolds, estimating engineer, has been transferred by Stanolind Oil & Gas Co. from Tulsa to Fort Worth, Tex.

Dr. V. E. Monnett, director of the school of geology at the University of Oklahoma, and **Dr. C. E. Decker,** research professor emeritus of geology at O. U., last week were awarded life memberships in the Oklahoma City Geological Society.

Warren L. Felton has been made assistant to **W. W. Keeler,** vice president of Phillips Petroleum Co. **L. Darrel Phillips** has been promoted from assistant manager to manager of the employe-relations department to succeed Felton, and **J. M. Brush** has been named assistant manager of the department. Felton joined the natural-gasoline department of the company in 1925, worked as a chemist at various Oklahoma plants, and advanced to assistant superintendent of the Oklahoma division. He has been manager of the employe - relations department since

PERSONALS

1938. Phillips joined the firm in 1938 and was recently appointed assistant manager of the department after serving as director of personnel research division since 1944. Brush joined Phillips at the Kansas City refinery in 1929 and later advanced to night superintendent. He had been in employe relations since 1945.

Arthur F. Holland, engineer with Skelly Oil Co., has been transferred to Albuquerque, N. M., from Tulsa.

D. R. Weishaupt, drilling engineer, has been transferred by Shell Oil Co. from Tulsa to Wichita Falls, Tex.

R. F. Christy, Tulsa, has been promoted to area geophysicist by Shell Oil Co.

Donald M. Murphee, formerly a consultant in Dallas, has joined S. D. Johnson Drilling Co. as a geologist at Greeley, Colo.

E. F. Fuller has been transferred by Phillips Pipe Line Co. from Alvin, Tex., to Oklahoma City.

Ernest W. Dean, consulting chemist on the general administrative staff of Standard Oil Development Co., Linden, N. J., has retired after being with the firm 31 years.

Clyde A. Dingfelder, formerly a petroleum engineer with Union Oil Co. at Newcastle, Wyo., has joined Baker Oil Tools, Inc., as a service engineer.

Dr. E. C. Hughes, Standard Oil Co. (Ohio), has been elected chairman-elect of the Petroleum Division of the American Chemical Society. He will succeed **Dr. F. D. Rossini,** Carnegie Institute of Technology, as chairman of the division, 1 year hence. Newly elected area representatives of the division include: **J. S. Ball,** U. S. Bureau of Mines, Laramie, Wyo., Area I; **Dr. R. W. Richardson,** Esso Standard Oil Co., Baton Rouge, La., Area II; **Dr. Vladimir Haensel,** Universal Oil Products Co., Des Plaines, Ill., Area III; **Dr. W. J. Coppoc,** The Texas Co., New York, Area IV; **A. C. Patterson,** Standard Oil Development Co., Linden, N. J., Area V; and **Dr. J. McAfee,** Gulf Research & Development Co., Pittsburgh, Area VI. On January 1, 1954, **Dr. Wheeler G. Lovell,** Ethyl Corp., Detroit, will take office as the new secretary-treasurer of the division, succeeding **A. G. Oblad,** Houdry Process Corp., Marcus Hook, Pa.

J. P. Cogan has been transferred by Shell Oil Co. from North Texas to Tulsa as a log engineer.

V. U. Gaither, party chief, has been transferred by Continental Oil Co. from Dade City, Fla., to Arcadia, Fla.

J. B. St. Clair, assistant chief technologist at Shell Oil Co.'s Wood River, Ill., refinery, has been appointed manager of the firm's newly established aromatics department.

Gerry Butterworth has been named assistant superintendent of the light-oils division of Standard Oil Co. (Ind.) at Wood River, Ind. He was transferred from the refinery at Sugar Creek, Mo.

J. C. Harris, formerly research director for Monsanto Chemical Co.'s central research department, has been named director of the company's newly formed application - research department at Dayton, Ohio.

Thomas P. Brooks has been made production superintendent for Southern Production Co., Inc., at Fort Worth. He had been the firm's division superintendent at Norman, Okla.

Ferril M. Miller has been named resident plant engineer for Cities Service Oil Co.'s Chicago terminal and compound plant. As resident plant engineer, Miller also will head the technical service department of the plant. **Roy Petterson** will succeed Miller as resident chemist at the plant's laboratory.

Paul Weaver, who recently retired as technical assistant to the vice president of Gulf Oil Corp., Houston, has joined the staff of Texas A. & M. College as a research geologist. He will teach senior and graduate courses in ground water geology and also will serve as a consultant for the college's water research and information center. Weaver had been technical assistant for Gulf since 1951.

G. H. Summers, seismic party chief for Continental Oil Co., has been transferred from McKinney, Tex., to Roswell, N. M.

W. O. Heap has been promoted to research chief of Seismograph Service Corp., Tulsa. He had been a party chief in the Rocky Mountain area.

Martin Barbour, formerly with Arabian American Oil Co. and connected with the Petroleum Administration for War a decade ago, has joined Procon, Inc., an affiliate of Universal Oil Products Co.

DEATHS

Carl Ragle Pate, 58, tax manager of Gulf Oil Corp.'s Philadelphia division, died recently in Philadelphia. He had been with Gulf 20 years and was a former president of the North American Gasoline Tax Conference.

Daniel Mahoney, 63, died September 19 at Ardmore, Okla., following a heart attack. He was in charge of crude-oil purchasing in southern Oklahoma and northern Texas for Stanolind Oil Purchasing Co., and had been with the firm and its predecessors for 35 years.

John Jacob Wilt, 75, general superintendent of San Joaquin Valley field for Standard Oil Co. of California for 1913 until 1938, died recently at Bakersfield, Calif. He joined Standard in 1910 as superintendent of West Side field in Kern County and was made division superintendent a year later.

Vincent T. Maloney, 57, died recently in New York. He was an administrative assistant in the treasurer's office of Standard Oil Co. (N. J.), and had been with the firm 43 years. He had been paymaster until being promoted recently.

Charles L. Harding, 47, a director and vice president of Socony-Vacuum Oil Co., Inc., in charge of Middle East affairs, died September 23 in New York after an illness of several months. Harding joined Shell Oil Co. in San Francisco in 1933 after being graduated from the University of California with a law degree. During the war, he served with the Petroleum Administration for War in various capacities, among them director in charge of District 1. He became a member of Socony-Vacuum's law department in 1944, a director in January 1948, and a vice president and member of the executive committee in January 1953.

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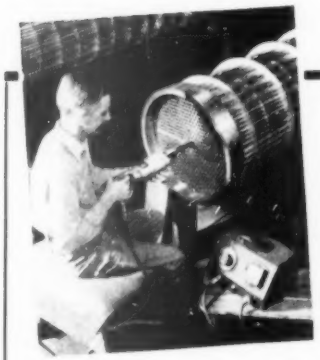

*Tubes being expanded using electronically controlled tube rolling machine. This method provides advantages as follows: (1) every tube is expanded uniformly with no over or under expansion, (2) there is no enlargement of tube holes, (3) ligament fracture is prevented, (4) there is minimum tube elongation and tube sheet warpage is reduced, (5) tube wall stresses are reduced, (6) guess work is eliminated, ideal standards for tube joints apply.

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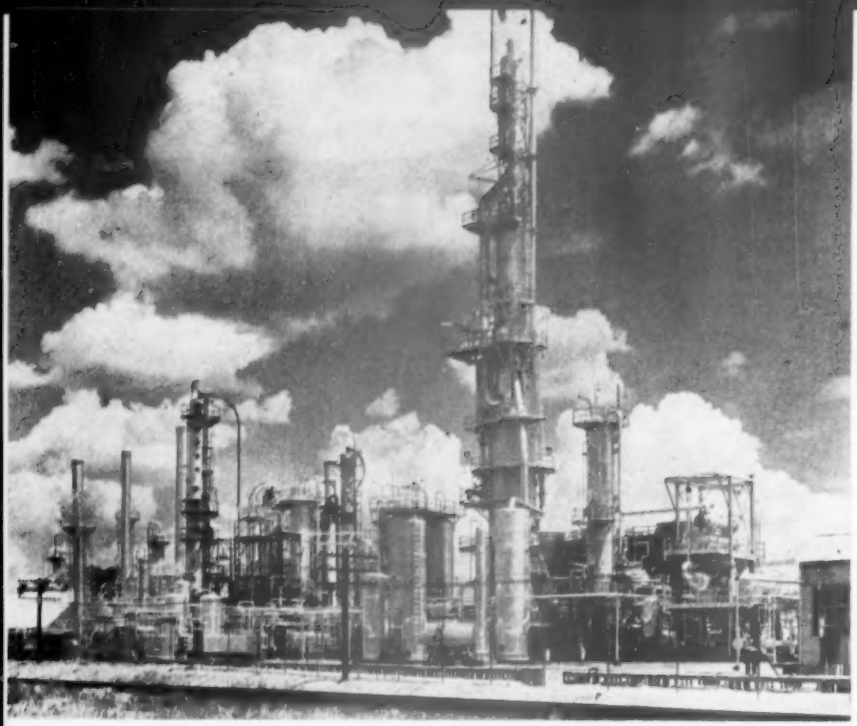


Over-all view of the modernized and expanded refinery of Bay Petroleum Corp. in Denver. New U.O.P. fluid catalytic cracker is designed for 3,500 bbl. per day of fresh gas-oil feed at 76 per cent conversion.

Bay Petroleum Improves Quality, Increases Over-All Yield . . .

Through expansion and modernization

by G. L. Farrar
Engineering Editor

and John C. Reidel
District Editor

WITH completion of its new U.O.P. cat cracker, the Bay Petroleum Corp. refinery at Denver is currently operating on a charge capacity of 11,000 bbl. per day, making it one of the largest refineries in the Rocky Mountain region.

In addition to the cat cracker, the new facilities include a revamped crude-topping unit, a visbreaker - vacuum unit converted from the former Dubbs thermal cracking unit, and gas-concentration and cat polymerization units. Through its expansion and modernization program, Bay has increased its over-all yield of refined petroleum products and has greatly improved the quality of these products.

The new cat cracker is designed for 3,528 bbl. per stream day of gas oil fresh feed at 76 per cent conversion with a coke-burning capacity of 3,770 lb. per hour. It is producing gasoline which has an octane rating above 91 without the addition of tetraethyl lead. The poly unit was redesigned to produce 315 bbl. per stream day of 10-lb. polymer.

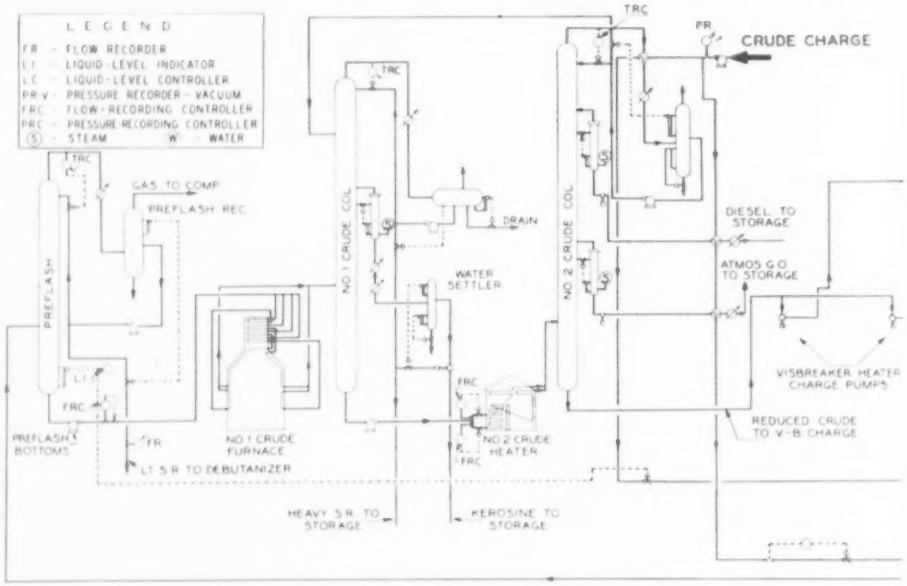
Former Operation

The Denver refinery, previous to the installation of a catalytic cracking unit, consisted of a crude skimming unit of 6,000-bbl. per day capacity and a two-coil Dubbs thermal cracking unit of 2,200-bbl. per day topped crude capacity. In addition to this, a 1,000-bbl. reforming unit was built in 1948 to reform the heavy-naphtha cut from the crude-skimming unit. This unit was only operated a short while and was converted into a 1,000-bbl. per day crude unit, making a maximum crude capacity of 7,000 bbl. per day.

The olefin gases from the thermal cracking unit were converted into polymer in a polymer unit, propane being separated as L.P.G. and the butane was added to the debutanized thermally cracked gasoline.

Formerly, the crude was heated by exchange heat from residuum and pumped through a crude furnace where it was further heated to about 625° F. and discharged into a crude-fractionating column. Straightrun gasoline was taken overhead and a cut of kerosine and diesel fuel were removed as side streams from the crude fractionator.

FLOW SCHEME FOR CRUDE DISTILLATION



The topped crude was discharged hot into the lower part of the thermal cracked fractionator to which was added the heavy cycle from the flash chamber.

The mixture of topped crude and heavy cycle stock was pumped into the heavy-oil cracking furnace and heated to about 920° F. outlet temperature. A light oil cut from the middle of the thermal cracked fractionator was pumped through a light-oil furnace and heated to about 1,020° F. outlet temperature.

The mixture of heavy-oil furnace and light-oil furnace effluent entered a reaction chamber on which a 275-psi. back pressure was maintained.

This mixture then entered a flash chamber at about 85-psi. pressure where the lighter material flashed off overhead into the thermal cracked fractionator and the residuum from the bottom of the flash chamber entered a second flash chamber where the remaining light ends were removed and this residuum cut was then pumped to storage.

The gases from the thermal cracking operation entered a primary absorber with debutanized gasoline as absorbent and then a secondary absorber with light cycle as absorbent where all of the C_4, C_3 and part of the C_2 fraction were absorbed.

The high-vapor-pressure thermally cracked gasoline was then pumped through a debutanizer and stabilized to about 45 psi. vapor pressure, and went to storage after caustic scrubbing and inhibiting, the vapors being also caustic scrubbed and pumped through the poly catalyst tower and the olefins converted into poly gasoline. The effluent from the catalyst tower was pumped through a deethanizer, depropanizer, and finally poly debutanizer towers where ethane and lighter went to the fuel-gas system, propane to L.P.G. storage, and poly with butane joined the debutanized thermally cracked gasoline on the way to storage.

To meet competitive octanes, the straightrun gasoline fraction was undercut and mixed with the thermally cracked fraction and house-brand gasoline was made with the addition of lead. To meet the octane requirements on premium gasoline, high-octane blending agents were purchased locally and mixed with the gasoline by the addition of more lead.

The installation of the fluid catalytic cracking unit solves all of the octane problems which formerly existed and the plant will be competitive with any refinery in the Rocky Mountain area.

Feed Preparation

In the present operation the Bay refinery charges a blend of Wilson Creek, Lance Creek, and Wellington crude oils to the revamped topping unit. In the present operation gas-oil feed for the cat cracker is prepared in the visbreaker-vacuum flashing operation, utilizing former thermal cracker equipment, as well as from topping. Gas and gasoline from visbreaking are stabilized in the revamped gas-recovery system. Visbreaker bottoms are blended to No. 6 fuel oil. The polymerization of the C_3 and C_4 olefins is effected in the revamped cat poly plant. Maximum utilization was made of existing equipment throughout. For example, the present poly operation is based on equipment which was obtained nearly entirely from the original unit.

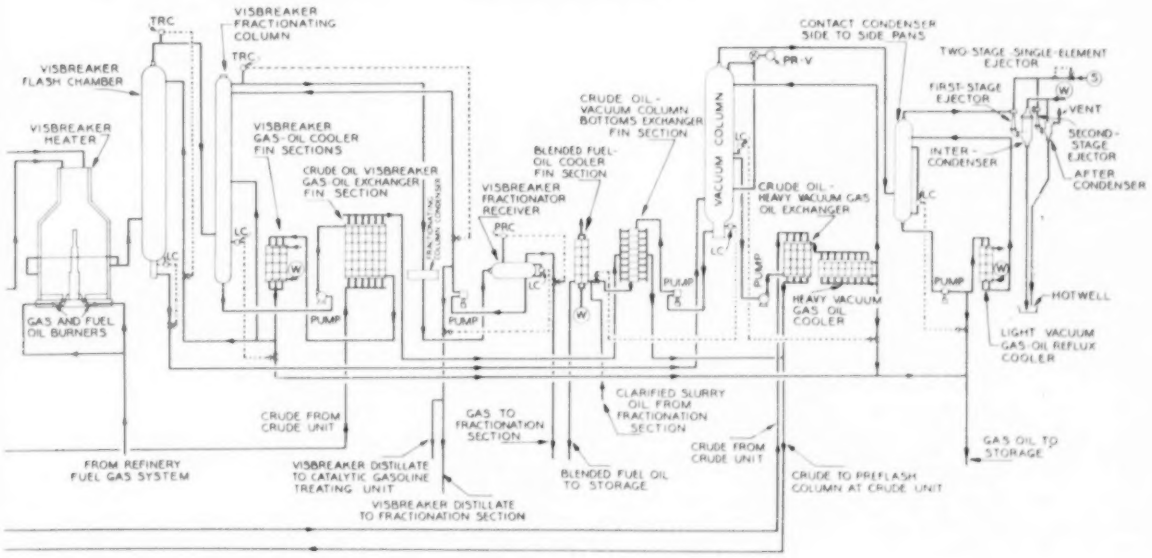
Atmospheric distillation . . . An idea of how the crude unit was revamped, utilizing existing equipment, may be obtained by following Fig. 1. The blended crude-oil charge, following heat exchange, enters a preflash drum which was formerly the reaction chamber of the thermal cracking plant. Light straightrun gasoline is taken overhead on the preflash drum. The preflash bottoms are heated in the No. 1 crude furnace, formerly the thermal reformer heater. The No. 1 crude column originally was the thermal cracking fractionator. In this latter vessel a naphtha cut (heavy straightrun) is taken off overhead and mixed with the light straightrun from the preflash and kerosine is taken off as a side cut.

The No. 1 crude column bottoms go through the second heater to the No. 2 crude column (former crude column), from which diesel oil and atmospheric gas oil are taken as side cuts. The topped crude (No. 2 crude column bottoms) are charged to visbreaking.

Visbreaking vacuum . . . The visbreaker heater and flash chamber were taken from former thermal cracking operation. Overhead vapors from the flash chamber are separated into visbreaker distillate and gas oil in the visbreaker fractionating column. This consists of 10 alloy bubble decks equipped with internal manways in the upper section and 6 alloy side-to-side pans in the lower part of the column. Visbreaker gas and gasoline are taken overhead and go to the cat cracker

(Continued on page 130)

AND CATALYTIC CRACKER FEED PREPARATION



STANDARD FORMS used by the Arkansas Oil and Gas Commission for reports on drilling and producing operations are relatively simple to use and are so similar to those of neighboring states that the commission will accept reports on other forms in emergencies.

It's Easy to Do Business in Arkansas

Oil and gas regulations are simple and capably administered by Commissioner's staff

by Henry D. Ralph
Journal Staff Writer

THE oil and gas laws of Arkansas are generally conceded to be about as complete and comprehensive as any in the nation, yet operators doing business in that state find little difficulty in complying with the relatively simple rules and procedures of the Arkansas Oil and Gas Commission.

One reason for this is that Arkansas' production is small compared with that of many other states and is largely concentrated in the southwest corner, close to the commission's headquarters in El Dorado. This enables the commission's staff to have a personal knowledge of operators and operations, and permits a degree of informality which minimizes legalistic red tape.

Another reason is that Arkansas was not a pioneer in conservation work, and thus escaped much of the controversial legislation and complicated litigation by which other states, notably Texas and Oklahoma, hammered out acceptable patterns of regulation. By profiting from the examples of other states, Arkansas was able to adopt, almost full blown, a system which has operated with little friction from the start.

The first general, comprehensive regulatory statute was enacted by Arkansas in 1939, which was 4 years after formation of the Interstate Oil Compact Commission. At that time the Arkansas law was considered something of a model, and it has been kept up to date through a number of supplemental and amendatory statutes.

Special commission . . . The laws are administered by a special Oil and Gas Commission composed of seven men appointed by the governor for staggered terms of 6 years each. The law requires that a majority of them must be experienced in oil and gas production. They are not full-time state employes, but receive a per diem fee when engaged on commission work. There has been very little politics connected with the commission's personnel or operations, and new governors usually reappoint former members whose terms are expiring. O. C. Bailey, an El Dorado producer, has been chairman since the commission was created.

The commission operates through a relatively small staff headed by P. M. McLaughlin, director of production and conservation and secretary of the commission. Offices are in the Trimble Building, El Dorado.

A new operator entering Arkansas should have little difficulty learning and complying with the state's regulations, particularly if he is accumstomed to the procedures and terminology used in other southwestern states. A single booklet and a small sheaf of forms give all the information necessary.

Basic regulation . . . The commission's basic regulation is Order No. 2-39, published in a 44-page pamphlet which

ARKANSAS OIL AND GAS COMMISSION
Producers Certificate of Compliance And Authorization to Transport Oil From Lease
ARKANSAS OIL AND GAS COMMISSION
Well Status Report and Gas-Oil Ratio
ARKANSAS OIL AND GAS COMMISSION
Transporters And Storers Monthly Report
ARKANSAS OIL AND GAS COMMISSION
Monthly Gas Report
ARKANSAS OIL AND GAS COMMISSION
Gasoline or Other Extraction Plant Monthly Report
ARKANSAS OIL AND GAS COMMISSION
Refiners Monthly Report

DETAILED CHECK on all production, use, storage, and transportation of oil and gas is maintained by the commission on forms such as these to provide statistical records and prevent "hot oil" running and operations in violation of its regulations.

also includes the texts of the applicable statutes. This contains all the statewide regulations, which are classified into general, drilling and production, oil control, gas control, transportation, and processing. For the most part the rules are simple and in nonlegal language, and the terms and definitions used are common to oil-field practice. Special rules and orders are issued for particular fields from time to time, and these take precedence over the general rules.

The forms required by the Arkansas Oil and Gas Commission also are simple and self-explanatory. Many of them are so nearly like those used by some other states that often operators use another state form when temporarily out of Arkansas forms, and these are usually accepted by the commission.

The first thing that any operator must do before entering any branch of the oil and gas business in Arkansas is to file Form 1, or "Organization Report." This one-page report gives the name and address of the company, organization, or individual; states the plan and purpose of the organization and the division of the industry it proposes to enter, and gives the names of the principals. There is no fee for filing this form, though, of course, if the operator is a corporation it must previously have compiled with the state's general corporation laws to do business in the state.

Drilling practices . . . No well may be drilled in Arkansas below the fresh-water level without an individual permit from the commission. To obtain this an operator must fill out a card called Form 2½, or "Notice of Intention to Drill or Deepen." This must be accompanied by a location map which may be a certified lease plot or may be sketched on Form 2½-A, at the operator's option. The information on the card and map must show the exact location of the proposed well and its distance from the nearest property line and from the nearest well. A flat fee of $50 is required for every drilling permit, regardless of type of well, location, or depth. Drilling may not start until the permit has been received, and the permit number and designation of the well must be displayed on the derrick during drilling. No permit is required to deepen.

Spacing patterns for new fields are established by special order, following a hearing, after a discovery has been made, and thereafter all well locations must conform to this pattern unless a special exception is granted.

A wildcat in Arkansas is defined as a well at least 2 miles from any commercial or potentially commercial oil or gas well and outside the boundaries of a proven area as designated by the commission. A wildcat may not be drilled closer than 330 ft. to any lease or property line. Exceptions to the spacing rules may be obtained where it is impractical to locate a well exactly at the spot called for by the rules.

During the drilling the operator is required to keep a complete daily drilling log showing all the data usually recorded in the normal procedure of drilling. This is to be available to the commission's agents at all times, and after completion of drilling it must be filed with the commission within 15 days. If requested, the log will be kept confidential for 90 days, unless the information is called for in some court proceeding. A copy of any electric log or well survey is also to be filed with the commission within 30 days after completion.

When drilling stops, either on a dry hole or successful well, the operator must file Form 3, or "Well Record," which calls for standard data about formations encountered, casing set, perforations, and similar details. Cores and cuttings are not required to be submitted.

If the well is dry, the operator must file Form 4, or "Application to Plug," at least 3 days prior to beginning plugging operations. This must be accompanied by a fee of $15 and the well record, and all offset leaseholders must be notified. A representative of the commission supervises all plugging operations, and within 5 days after completion the operator must file Form 5, or "Plugging Record," setting forth in detail the method used.

Well plugging . . . Both Form 5 and the commission's general regulations describe the methods to be used in plugging a well. In general these require at least 15 ft. of cement above

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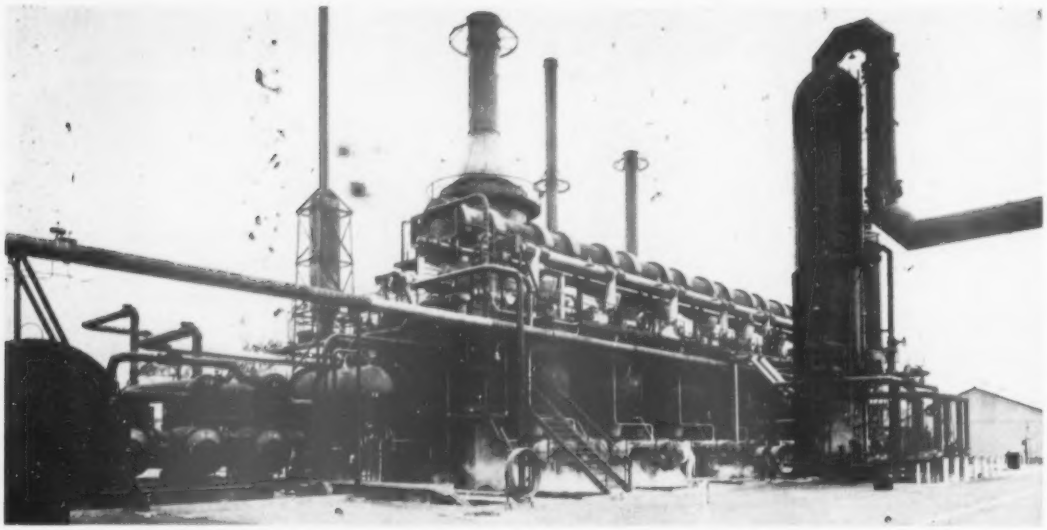

Houdry dehydrogenation plant at El Segundo refinery, Standard Oil Co. of California. This unit, originally designed for manufacture of butadiene from butane, is now in butadiene-butene production.

PETROCHEM REPORT

Butadiene From Normal Butane in One Step

. . . using the Houdry dehydrogenation process

THE dehydrogenation process of the Houdry Process Corp. is used commercially to produce butadiene directly from normal butane or from butane-butene mixtures and to produce butene from normal butane.

Pilot-plant investigations have demonstrated that the process can be applied to the production of propene from propane, isobutene from isobutane, isoprene from isopentane, styrene from ethyl benzene, and methyl styrene from isopropyl benzene.

The process provides the only commercial single-step process for the production of butadiene from normal butane.

Characteristics Process

The fixed-bed dehydrogenation step is a cyclic adiabatic process, since the operating conditions are so chosen that the heat required for reaction during the on-stream period is substantially equivalent to the heat supplied by the combustion of the coke deposit during the regeneration period.

The desired heat capacity of the catalyst bed is obtained by mixing a catalytically inert material of high heat capacity with the active pelleted catalyst. The inert material acts as a heat-storage medium, absorbing the heat liberated by the combustion of the coke deposit during the regeneration cycle, with a consequent increase in temperature of the bed.

The heat is released to the reacting hydrocarbons during the dehydrogenation period, with decreasing temperature. The inert material possesses a very large surface and the heat exchange between this material, the catalyst pellets, and the reactants takes place with very small temperature differences.

The preferred condition is that the heat of reaction be slightly greater than the heat of combustion. The heat deficiency and the desired operating temperature are controlled by the adjustment of reactant and air temperatures, and by the use in the regeneration cycle of an amount of air substantially greater than the combustion requirements.

The latter equalizes differences in temperature in a large-size bed due to heat losses in parts adjacent to the wall, slight variations in the distribution of reactant flow through the bed, minor inequalities in catalyst activities and heat capacities, and the like. The air used being near atmospheric pressure, the cost of pumping is nominal and the sensible heat in the regeneration flue gases can be covered in waste-heat boilers.

On stream . . . The on-stream periods are very short, between 7 and 15 minutes. By this means the temperature variation during the cycle is usually less than 50° F., providing for the optimum range of temperature necessary to insure high conversions. The total coke deposited on the catalyst is thereby limited to a low value, insuring high catalyst activity throughout the cycle.

Motor-operated valves controlled by a cycle timer are used to change the various operations, thereby minimizing the amount of operating labor required.

The advantages derived from the use of this scheme are as follows:

1. Expensive special alloy heat-exchange equipment within the reactor is eliminated and the reactor construction cost is minimized.

2. Reactants are introduced at substantially reaction temperature, eliminating problems of prethermal cracking.

3. The temperatures are controlled within the desired temperature range for reaction. No excessive temperatures are encountered during the regeneration period, thus protecting catalyst life.

4. Regeneration can be accomplished by the use of fresh air, and there is no recirculation of hot gases.

"We had to make certain about desalting—

so we called Howe-Baker"

Refiners throughout the world consult Howe-Baker about emulsion problems. In fact, on 3 continents more than 1,000,000 barrels of crude oil per day are being treated by custom built electrostatic units designed by Howe-Baker. Call us for a detailed discussion of your particular requirements.

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THE HOWE BAKER CORP.

ESPERSON BUILDING • HOUSTON 2, TEXAS

This Dominant Oil and Gas Area Has Developed Several Great "OIL BANKS"

One of the Foremost . . . Second National of Houston . . . offers oil and gas men many specialized, money-saving services

It is natural that a region representing only 1% of the world's land area, but producing 38% of its petroleum . . . should have developed great "oil banks." Second National of Houston, situated at the hub of world oil activity, has been among the foremost in this development . . . has become one of the region's leading oil banks. What does this mean to oil men, in specialized banking services?

Oil and Gas Division. It means a special Oil and Gas Division in the bank, staffed by geologists and petroleum engineers of wide practical experience. Increasing numbers of oil and gas men follow a practice of consulting these specialists on their plans and problems. The department subscribes to the oil and gas reports, journals, reports on wells drilled . . . maintains up-to-the-minute statistical files, complete sets of field maps, county maps, etc. A valuable service is rendered to customers through a bank-by-mail attention to their loans, by furnishing them complete single-page records of run incomes from their wells, balanced against note requirements and disposition of excess funds. Customers value highly the resultant saving in time and record-keeping.

The Collection Department of the bank renders daily service to oil and gas men and firms. For example, the department accepts drafts with leases and assignments attached for presentation to the oil companies, and acts as a clearing house for lease brokers in assembling blocks and as agent for major oil companies.

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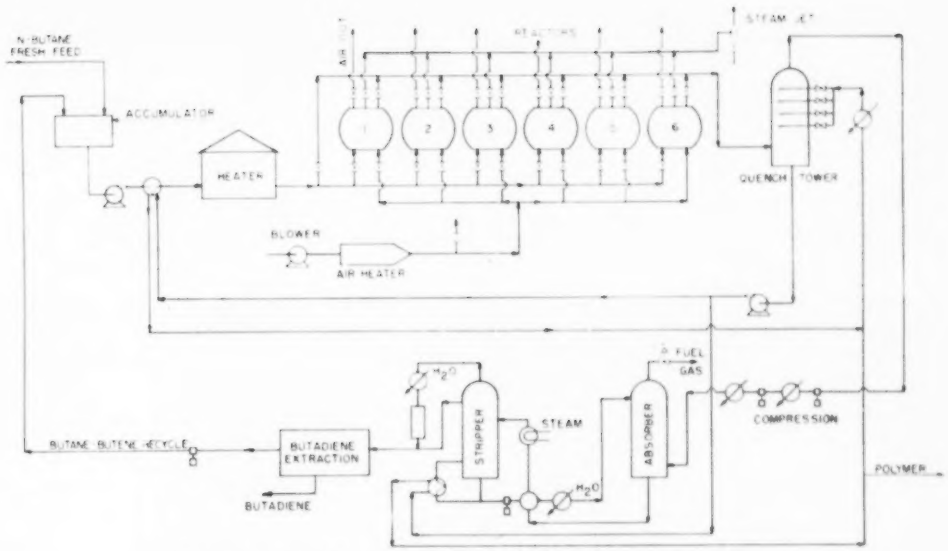

Houdry one-step dehydrogenation process is a cyclic adiabatic operation.

5. High conversion per pass and high product concentration are feasible.

Production of Butadiene

The dehydrogenation of butane and butane-butene mixtures to produce butadiene is accomplished by passing the fresh feed, consisting mainly of normal butane, and the butane-butene recycle stock from the butadiene-recovery unit over a chrome-alumina type catalyst. The normal butane fresh feed and the butane-butene recycle stock from the butadiene recovery plant are pumped to an accumulator from which they are pumped through a feed-quench oil exchanger and through a heater where they are heated to approximately 1,150° F. before entering the reactor.

The effluent from the reactor is partially quenched in a line exchanger and then further cooled in the quench tower by direct contact with a circulating quench oil. From the quench tower the effluent passes to a knockout drum prior to the first stage of the four-stage compressors. The overhead from the last knockout drum passes to a conventional absorber and stripper for recovering the C_4 and heavier material.

The bottoms from this drum pass to the reflux accumulator of the stripper. The effluent from the stripper passes to the butadiene recovery and purification unit. Details of the compressor section are not shown in the simplified flow diagram.

The on-stream period of each reactor is followed by a vacuum purge to remove hydrocarbons and then regeneration is carried out with air which is preheated by direct combustion of fuel in the air stream. At the end of the regeneration period the reactor is purged by means of a steam ejector prior to the following on-stream period. Thus, in a three-reactor group, one reactor receives hydrocarbons while the second receives air and the third undergoes valve changes and purging operations.

The major process variables are temperature, pressure, space rate, and time on stream. For butadiene operation, average temperature is 1,125° F., pressure is 5 in. Hg abs., space rate is 1.0-1.5 volume feed per volume catalyst per hour, and time on stream is 8-10 minutes.

Typical yields for producing butadiene are given in Table 1.

TABLE 1—PRODUCTION OF BUTADIENE

	Fresh feed (% wt.)	Recycle (% wt.)	Total feed (% wt.)	Reactor product (% wt.)	Ultimate yield % wt. butane fresh feed
Hydrogen				1.9	10.1
Methane				1.0	5.3
C_2				1.1	5.9
C_3				1.1	5.9
Isobutane	0.5	(*)	(*)	(*)	
Isobutene		(*)	(*)	(*)	
n-Butene		41.4	33.6	33.6	
n-Butane	99.5	57.9	65.8	47.0	
Butadiene		0.7	0.6	11.1	55.8
C_5+				0.5	2.7
Coke				2.7	14.3
Total	100.0	100.0	100.0	100.0	100.0

*Included in n-C_4 fractions.

Production of Monoolefins

For the production of butenes and isobutene from the corresponding nor-

TABLE 2—PRODUCTION OF BUTENE AND BUTADIENE

	Fresh feed (% wt.)	Recycle (% wt.)	Total feed (% wt.)	Reactor product (% wt.)	Ultimate yield % wt. butane fresh feed
Hydrogen				2.1	7.4
Methane				1.4	4.9
C_2				1.5	5.3
C_3				1.6	5.6
i-Butane	0.5	(*)	(*)	(*)	
i-Butene		(*)	(*)	(*)	
n-Butenes		35.6	25.5	34.9	33.1
Butadiene		0.7	0.5	9.8	32.7
n-Butane	99.5	63.7	74.0	45.6	
C_5+				0.5	1.8
Coke				2.6	9.2
Total	100.0	100.0	100.0	100.0	100.0

*Included in n-C_4 fractions.

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mal and isobutane, the reaction is conducted at atmospheric or slightly higher pressures and the space rate adjusted to balance the coke formation with the necessary heat of reaction.

The flow sheet is substantially the same as the butadiene unit. Line sizes and compressor requirements are smaller for the monoolefin operation as the reactor pressure is maintained at slightly above atmospheric pressure instead of using a pressure of 5 in. Hg abs. Approximately 1-2 per cent of butadiene is produced at the higher operating pressure.

If it is desired to produce additional butadiene as well as butenes, the process is operated under reduced pressure and the desired quantity of butenes is separated from the recycle stream before the remaining butane-butene is recycled. Typical yields for this operation are given in Table 2.

The normal operating conditions for producing a major quantity of monoolefins and a minor quantity of diolefins are: Temperature 1,125° F., pressure 10 psig., space rate 1.5-2.0, and on-stream time 8-10 minutes.

Typical yields for producing mainly butene from butane are given in Table 3.

TABLE 3—PRODUCTION OF BUTENE

	Charge (% wt.)	Product (% wt.)	Ult. yield at high conversion % wt. n-butane fresh feed
Hydrogen		1.6	3.4
Methane		2.4	5.1
C_2		2.7	5.8
C_3		3.4	7.2
Isobutane	0.5	0.3	Tr
Isobutene		0.2	Tr
n-Butene		32.0	68.2
n-Butane	99.5	52.6	
Butadiene		2.0	4.3
C_5+		0.6	1.3
Coke		2.2	4.7
Total	100.0	100.0	100.0

Note: Ultimate yield of butene would be increased at lower conversion and at lower pressure.

Texas Illinois to Bridge Two Gas Lines Across Mississippi

CHICAGO.—Texas Illinois Natural Gas Pipeline Co. here plans to build a 2,150-ft. suspension bridge across the Mississippi River for two 30-in. gas lines in connection with the company's 1,019-mile natural-gas system from Wharton, Tex., to Joilet, Ill.

The structure will span the river at Wittenberg, Mo., and Grand Tower, Ill. It will supplement an existing under-water line located south of these two towns.

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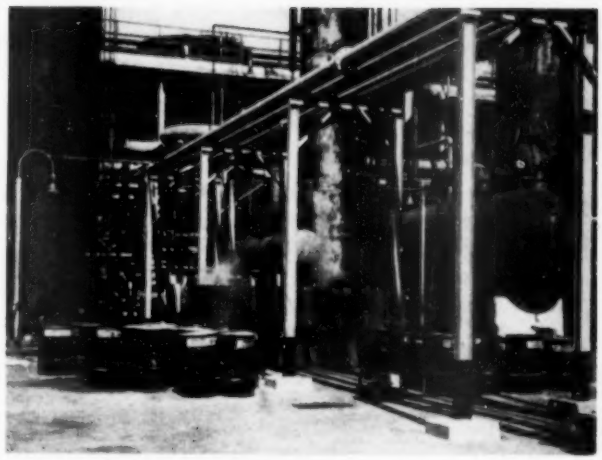

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A SYMPOSIUM . . . Conducted by Geophysical Society of Tulsa

ROLE OF GRAVITY IN AN EXPLORATION PROGRAM

"A great many geophysicists are often inclined to forget that geophysics is a science with many methods at its disposal. They are also often inclined to forget that seismograph fails many times, and that the number two method, gravity, may often constitute our number one method in such cases.

"It is entirely possible that there are many cases where the seismograph itself should be checked by gravity. One point that cannot be overlooked is the fact that 55 per cent of the sedimentary area of the United States is poor reflection area, whereas the gravity meter records data wherever it goes.

—*Panel Moderator*

Usefulness of High-Quality Gravity Surveys

by Sigmund Hammer

. . . in prospecting for oil

1 Like all other exploration methods, gravity is not uniformly successful in all areas. This depends upon the physical properties of the rocks which vary from place to place. Therefore, we cannot lay down a blanket rule that a gravity survey should always precede leasing or other geophysical work.

2 While there are special cases where a gravity survey tells an adequate geophysical story, these are now rather exceptional. In the present state of geophysics, it is seldom that a gravity survey is used alone, without verification and additional detailing of the gravity prospects by other geological and geophysical methods.

3 Gravity is principally useful for reconnaissance to guide and localize leasing and seismic work. Many instances can be cited where adequate gravity reconnaissance has effectively localized leasing and limited seismic work to small fractions of the area. Considering the tremendous differences in cost, even a very slight guidance from the gravity results will greatly increase the effectiveness and efficiency of the over-all exploration program.

TODAY it is generally considered that gravity surveys are for reconnaissance to guide, localize, and limit more detailed and more expensive exploratory operations to follow. This is as it should be. It is worth while, however, to remember that this was not always the case.

In the early days of geophysical exploration for salt domes in the Gulf Coast, seismic fan shooting was used in reconnaissance to find salt-dome prospects which were then detailed by localized torsion-balance gravity surveys to verify the existence of the dome and to define more precisely its location and details for the guidance of test drilling.

The pendlum has now swung far in the other direction, and correctly so; but complete abandonment of gravity detailing, in favor of seismic detailing is not desirable nor justified.

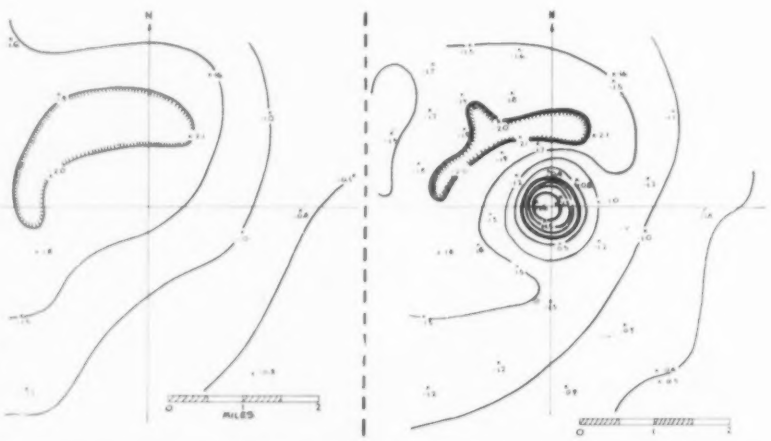


Fig. 1—Gravity survey illustrating how a salt dome may be missed by inadequate control. Left, original reconnaissance survey. Right, adequate survey showing dome.

Types of Gravity Surveys

There are three types of gravity surveys from the point of view of the exploration geophysicist. They are: (1) regional, (2) reconnaissance, and (3) detail. It is only natural that the three types of surveys have different specifications as to accuracy, station spacing, and over-all quality. This article is concerned principally with the third type. Several examples of high-quality, detailed gravity surveys are included to demonstrate the usefulness of such work in an exploration program.

The first example illustrates how an important geophysical prospect may be missed completely if the gravity survey fails to come up to the required qual-

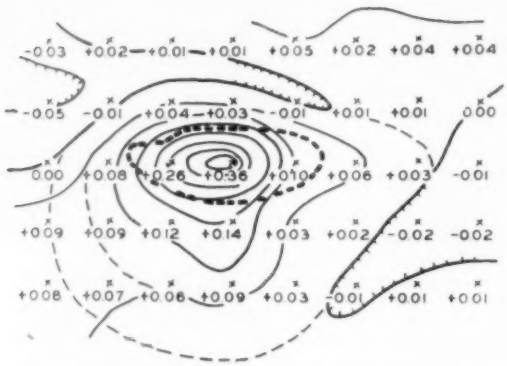


Fig. 2—Gravimeter anomaly on chromite ore body in Cuba. Station spacing: 20 meters.

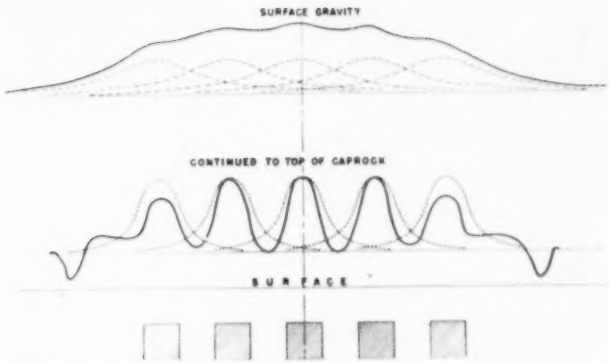


Fig. 6—Hypothetical structure illustrating resolution by continuation of surface gravity data to depth.

ity as regards closeness of station spacing. The left half of Fig. 1 shows the gravity picture from an open reconnaissance survey. The right half of the figure shows a shallow, piercement dome revealed by a more detailed survey. The intersection of the perpendicular lines is at the same spot in both cases. Note that the actual gravity value at this point differs by 3 mg. on the two maps. (This is an actual field example from the salt-dome province in Mississippi.)

There can be no doubt that the reconnaissance survey failed to achieve its objective in this instance. How many company files contain similar examples? This demonstrates the axiom that, to be useful, a gravity survey must be carefully planned to be of high enough quality to achieve its stated purpose.

Another example of useful high-quality field work is shown by Fig. 2. This represents the highest-quality gravity survey of which I have knowledge. The station spacing is 20 m. (65 ft.) in a square grid. The probable error of the gravity determination is ±0.016 mg. The gravity anomaly, which pictures a 40,000-ton chromite orebody in Cuba, is about 200 ft. across and has a gravity relief of less than ½ milligal. Anything but a very high-quality gravity survey would fail completely in this instance.

High Quality a Must

Some interpretation problems cannot be solved successfully without commensurate high-quality gravity data. One such problem is to separate or isolate the effects of two or more structures which are so near together that their gravity anomalies overlap. This is a problem in resolution. Fig. 3 shows a strong, round gravity minimum which, at first glance, looks like a very nice salt-dome prospect. At least that must have been the considered opinion of the exploration departments which drilled three dry holes within the closing contour at the center of the anomaly. Actually, this is probably the most unfavorable spot to drill in the entire area as will be shown subsequently.

A conventional residual gravity map of the same area is shown in Fig. 4. The residual anomaly shows some suspicious irregularities around the edges; but the three dry holes, for all practical purposes, are still within the central closing contour. Obviously, the conventional residual gravity analysis has not yielded a satisfactory interpretation. Evidently, we need sharper in-

THE AUTHOR

Sigmund Hammer is in charge of the Gravity Interpretation Section of the Geophysics Division of Gulf Research & Development Co., Pittsburgh. He is also a lecturer at University of Pittsburgh where he teaches a course in geophysical prospecting.

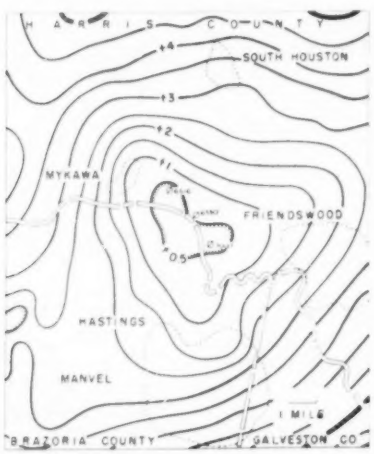


Fig. 3—Bouguer gravity anomaly showing lack of resolution of Mykawa, Friendswood, Hastings, South Houston, and Manvel domes, Brazoria and Harris counties, Texas.

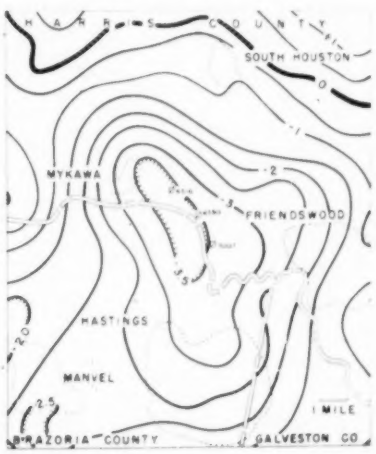


Fig. 4—Residual gravity map of the Hastings dome area which has failed to resolve the domes.

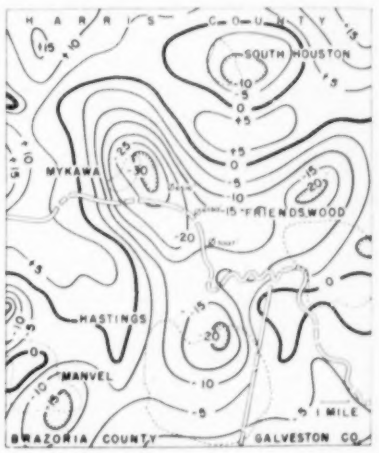
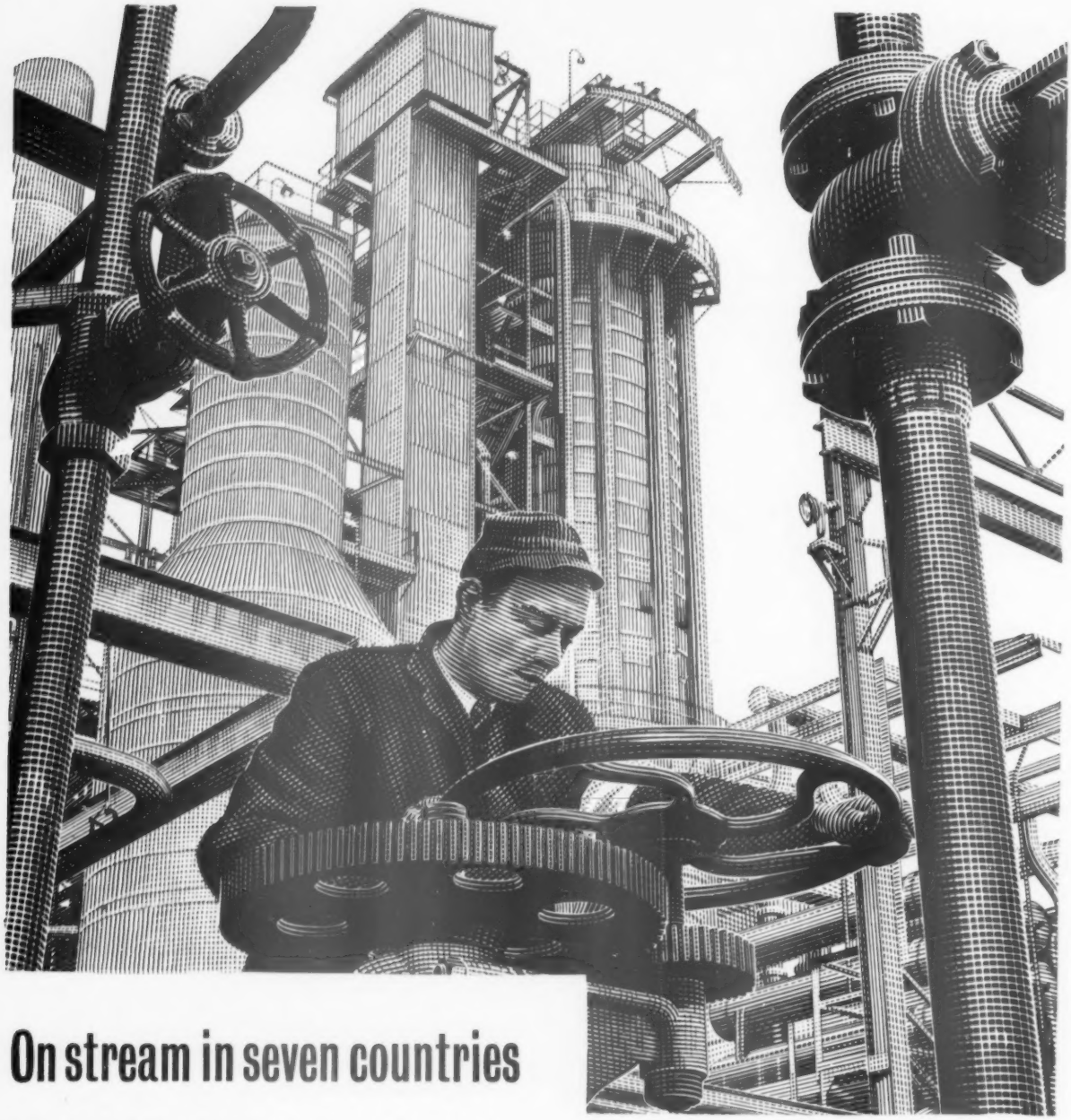


Fig. 5—Gravity second derivative showing resolved anomalies on Mykawa, Friendswood, Hastings, South Houston, and Manvel domes.



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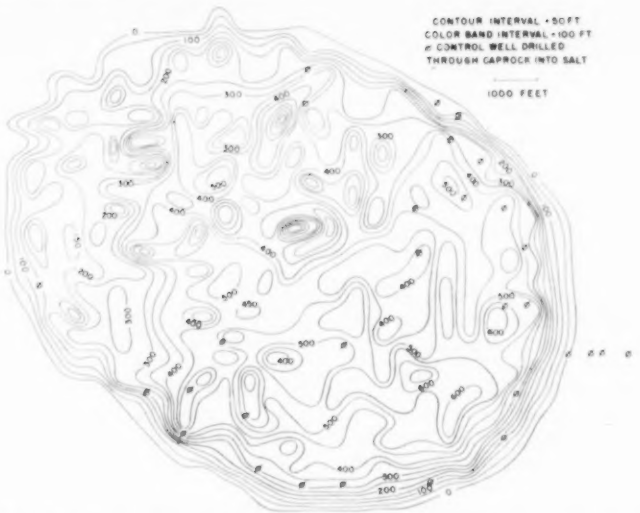

Fig. 7—Interpreted caprock thickness from detailed gravity survey, Moss Bluff dome, Liberty and Chambers counties, Texas.

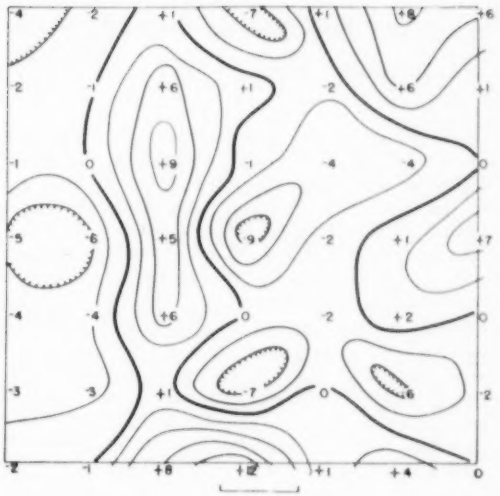

Fig. 10—Second derivative gravity map computed from random error data. This illustrates importance of high quality data. (After Elkins.)

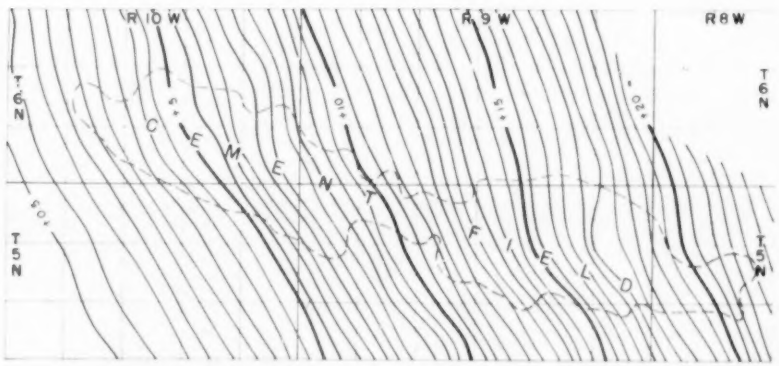

Fig. 8—Bouguer gravity map, Cement field, Caddo County, Oklahoma.

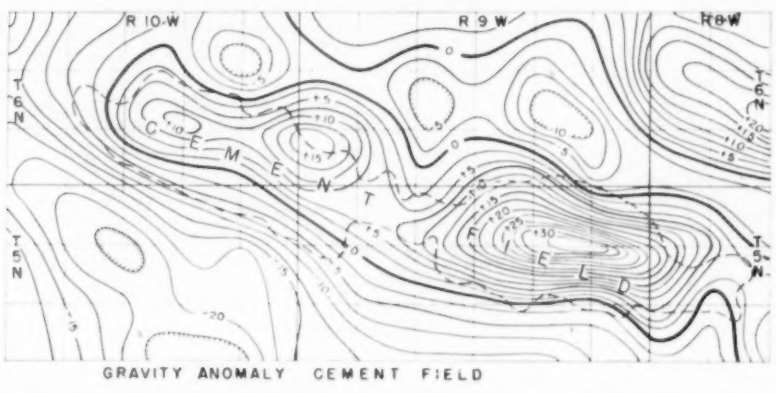

Fig. 9—Second derivative gravity calculated from data on Fig. 8, showing localized anomaly on Cement field, Oklahoma.

terpretation methods with stronger resolving power. One such interpretation method is the gravity second derivative.

Fig. 5 shows second derivative gravity results calculated from the high-quality data on the previous figure. The resolution of the gravity anomaly into its component parts is clearly evident. It is obvious on this map that not one but actually five separate local features are present. Each one of these resolved, local anomalies represents an important oil field. The three wildcats are left stranded ("low and dry") in the interdomal syncline between the fields. It is small comfort to the promoters of these three wildcats to have it pointed out that the five oil fields on this figure have produced to date a total of 425 million barrels of oil and have an estimated ultimate production of more than 1 billion barrels.

For complex structures . . . Another type of interpretation problem involves what is called "Continuation." This also requires a high-quality gravity data for successful application. Without becoming too technical, Fig. 6 illustrates the theory and suggests the applications. The solid line at the top of the figure shows the gravity profile which would be mapped by a survey on the surface of the ground over the several subsurface structures shown at the bottom of the figure. The component gravity anomalies due to the individual structures are indicated by dashed lines at the top of the figure. The observed profile, which is the sum of these individual anomalies, shows a single broad high with only very slight waviness to hint that a complex structural mass is present. With a low-quality survey, these minor wrinkles would probably be discounted entirely as insignificant observational errors in the data. If the survey is good enough to define these details, however, it is possible to calculate the "continued gravity picture" below the ground surface, near the top of the structures. This is illustrated in the center of the figure. Here again, the solid line (as computed by continuation downward

". . . some exploration geophysicists and geologists seem inclined to take gravity lightly. As a gravity man, I deplore this attitude because to me gravity is a subject of some weight."

of the surface data) represents the total gravity effect which would be observed if the survey were made underground at the level of the top of subsurface masses. The individual anomalies are clearly resolved.

A useful application of this theory is shown by Fig. 7. A special high-quality gravity survey with stations spaced 500 ft. apart in a square grid was made over the dome. The interpreted caprock thickness map has been useful in guiding test drilling in the caprock. A commercial sulfur plant is now in operation on Moss Bluff dome.

For accurate analysis . . . Another example of second derivative analysis of high-quality gravity data is shown by Figs. 8 and 9. Fig. 8 shows Bouguer gravity results over Cement field in southwestern Oklahoma. Even with the guidance of the oil-field outline, it is very difficult to see a gravity anomaly associated with the Cement structure. Conventional residual gravity analysis also does not satisfactorily depict the field. With a low-quality gravity survey, we would have to throw up our hands and say that gravity prospecting is useless in seeking similar structures in the Anadarko basin. That such a conclusion is wrong is clearly indicated by Fig. 9. This figure shows how very definitely Cement field is depicted by second derivative analysis of high-quality gravity data. The gravity survey in this instance consists of stations at ½-mile spacing along section lines (centers of sections omitted to speed the work) with gravimeter observations having a probable error of ±0.05 mg. or less. The associated surveying data and station reductions were carried out with commensurate precision.

Conclusion

Many other examples of useful results of high-quality gravity surveys have been published. The examples given in this article were selected to illustrate a broad range of applications.

A word of warning is in order. It is seldom possible to judge, by looking at a map, whether the indicated anomalies, on the one hand, are real and geologically significant or, on the other hand, spurious statistical assemblages of observational errors. Interpretational methods of high resolving power are very sensitive to errors in the data. This is illustrated by Fig. 10.

The anomalies on the map are similar in size, shape, and general character with those associated with important geological structures. However, the map was computed from a random set of error values and has no physical significance whatsoever. Tests can be set up to establish the general level of precision required for any specified exploration problem. However, after a survey has been made, there is no possibility of eliminating random observational errors in the data. Interpretational methods of high resolving power will magnify the errors of observation as well as the significant gravity anomalies. There is no substitute for quality in the data.

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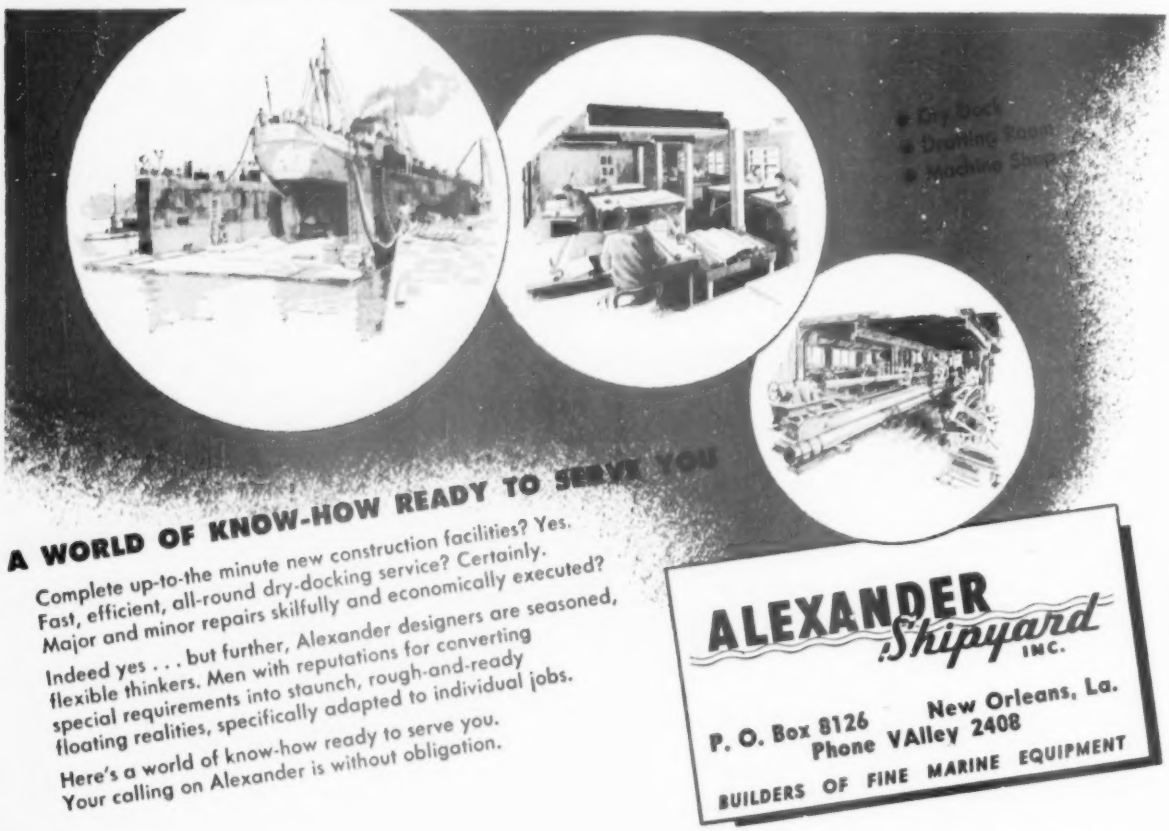

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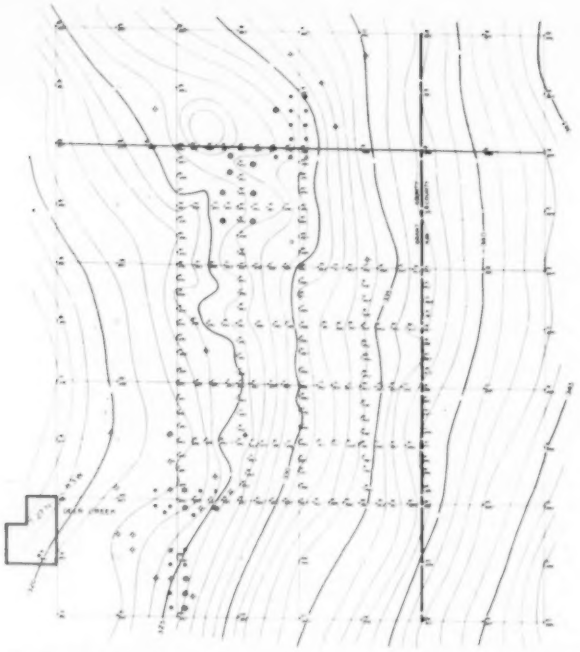

Fig. 1—A Bouguer gravity map in the vicinity of Deer Creek and Webb pools in western Grant County, Oklahoma. Contour interval: 1 unit (0.1 milligal). Station spacing: ⅛ mile.

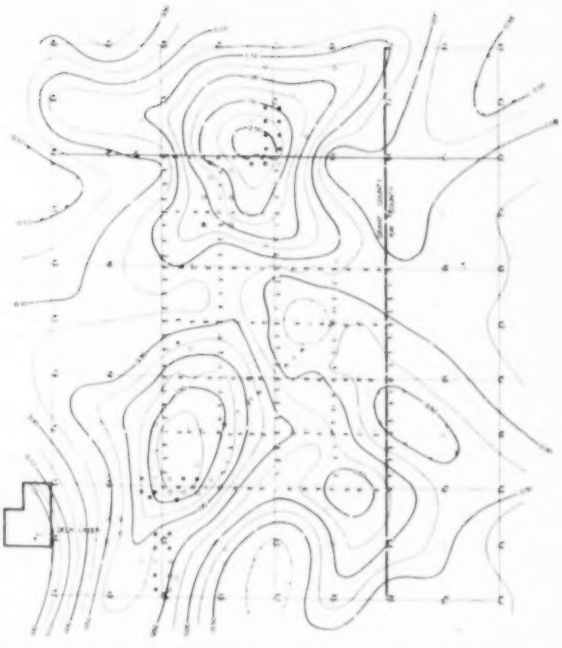

Fig. 3—A vertical gradient interpretation map derived from Fig. 1. Closer control permitted resolution of broad gravity nosing into two maximum anomalies caused by two separate structures. Contour interval: 0.25 Eotvos units. Station spacing: ⅛ mile.

Let's Look at Gravity's Discovery Record

by E. V. McCollum

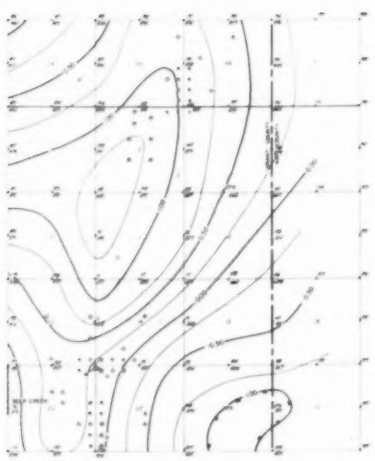

Fig. 2—An interpretation map based on an original survey of the Webb area. Maximum closure falls between the two fields. Contour interval: 0.25 Eotvos units. Station spacing: ½ mile.

1. Gravity has played an important role in the discovery of structures favorable to the accumulation of petroleum, particularly in salt-dome provinces.

2. Carefully executed gravity surveys should lead to many more discoveries in the future.

3. Gravity methods should continue to place second to seismograph among all geophysical methods in areas where the seismograph is successful.

4. Gravity methods should be the dominant method in areas too difficult for the seismograph.

IN order to evaluate the importance of gravity methods as an exploration tool, 27 structures as described in Geophysical Case Histories, Vol. 1 (1948) were selected for review.

Ten of these structures are considered as gravity discoveries. (See Table 1.) Additional structures with good gravity anomalies are presented in Table 2. These eight fields could have been discovered on gravity information had test wells been located near the centers of the gravity anomalies shown by the several authors. It is thus seen that 18 out of 27 structures were or could have been found by gravity methods.

The nine additional cases classed as structures with inadequate anomalies are shown in Table 3. In spite of the arbitrary classification of these particular fields the torsion balance had considerable to do with Friendswood, Darrow, Cameron Meadows, Tepetate, Gibson, and University fields in that gravity minima lead to leasing, drilling test wells, or reflection-seismograph surveys.

It will be recognized that the majority of the cases reviewed above are located in salt-dome provinces. In the search for salt domes a favorable condition exists in that large density contrasts are present over liberal depth

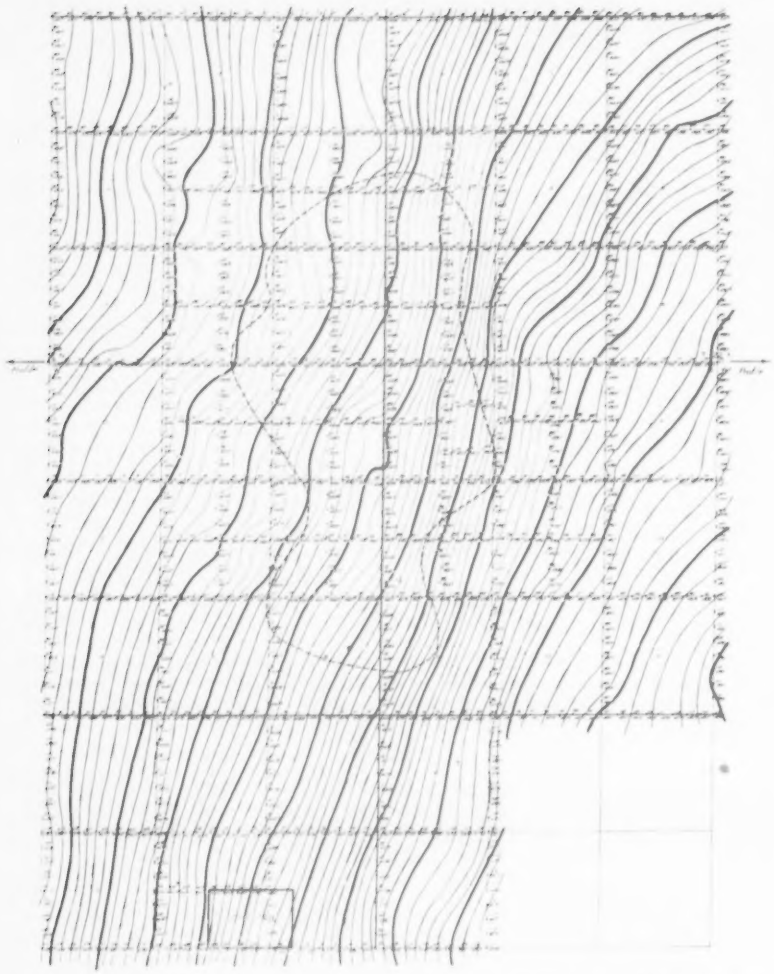

Fig. 4—Bouguer gravity map of Garber field, Oklahoma. Note gentle nosing of the gravity contours in the vicinity of the field, which is indicated by dashed line. Contour interval: 0.1 milligal. Stations were spaced at an interval of 660 ft. on all section lines and most of the half-section lines within and adjacent to the oil field.

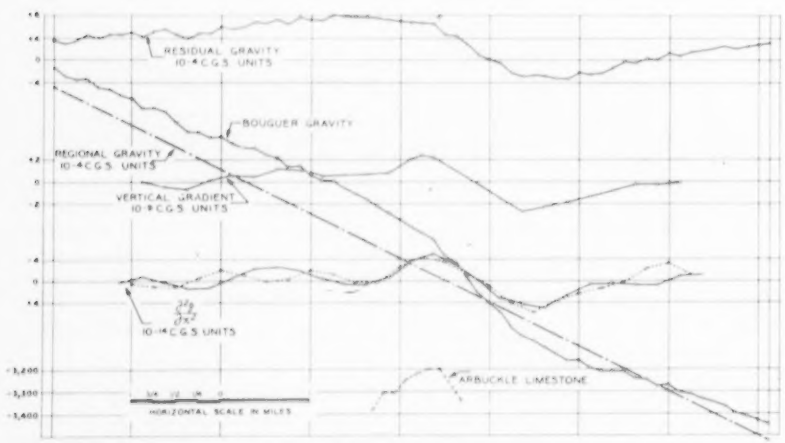

Fig. 6—A west-east profile along line marked "profile" in Figs. 4 and 5. The second horizontal derivative of gravity gives a favorable anomaly over the Garber structure.

THE AUTHOR

E. V. McCollum is associated with E. V. McCollum & Co., Tulsa, gravity, magnetic, and seismic contractors. He was with Marland Oil Co. from 1926 until 1929, Continental Oil Co. from 1929 to 1939, and with Mott-Smith Corp. as chief geophysicist from 1939 until September 1943.

TABLE 1—STRUCTURES DISCOVERED BY GRAVITY

Structure and author—	Torsion balance	Refraction	Reflection	Gravity meter
Nash—Barton	1924			
S. Houston—Eby	1934		1934	
Esperson—Thompson & Day	1928		1930	
Tomball—Eby	1929	1929	1930	
Lake St. John—Smith and Gulmon			1939	1939
New Hope—Nettleton		1940		1937
D'Lo—Nettleton		1941		1937
LaGloria—Wooley	1934		1936	1943
Fort Collins extension—Wilson	1926			1940
Lispe—Skeels and Vajk	1934			

TABLE 2—STRUCTURES WITH GOOD GRAVITY ANOMALIES

Structure and author—	Torsion balance	Refraction	Reflection	Gravity meter
Anahuac—Bader	1929	1925	1933	
Lovell Lake—Wendler	1929	1927	1933	1936
Cayuga—Peacock			1932	1941
Iowa—Eby	1929	1929	1929	
Ville Platte—Warren			1936	1938
Magnolia—Spencer and Peters			1937	1942
Cole Creek—Shade	1936		1936	1940
Reitbrook—Behrman	1918	1920	1937	1939

TABLE 3—STRUCTURES WITH INDEFINITE ANOMALIES

Structure and author—	Torsion balance	Refraction	Reflection	Gravity meter
Friendswood—Patrick	1929		1934	
Darrow—Eby and Harkins	1928	1927	1929	
Cameron Meadows—McGuckin	1927	1926	1929	1943
Tepetate—Barton	1929		1933	
Gibson—Goldstone	1928	1936	1936	
University—Atwater	1931		1934	
East—Hollingsworth	1934		1942	
Rio Bravo—Sloat			1935	1940
Raisin City—Sloat			1937	1942

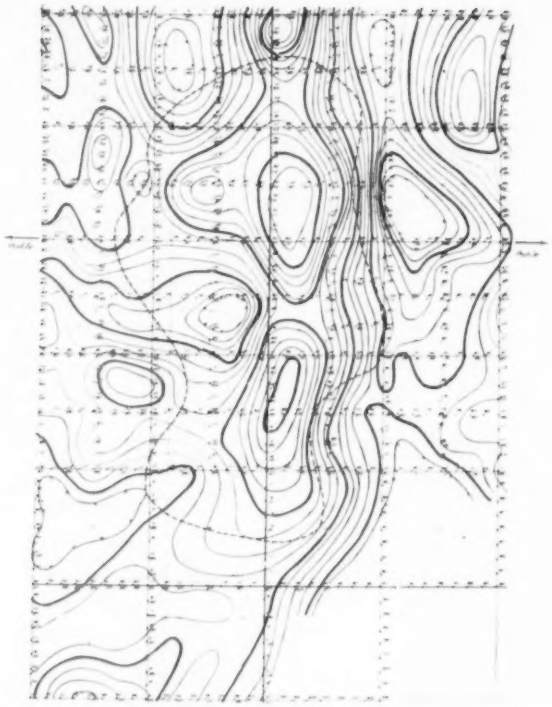

Fig. 5—Vertical gradient map derived from Fig. 4. Note that a north-south trend of the maximum anomalies falls within the oil field. Contour interval: 0.25 Eotvos.

ranges due to the fact that the density of salt is affected very little by depth of burial, whereas, the densities of the sediments (particularly shale) increase, until at depths of burial of a few thousands of feet sedimentary rocks acquire density values that are equal to or greater than the density of granite. Density contrasts in the lower levels of a salt dome structure of the order of 0.4 g. per cc. contribute to gravity anomalies of considerable magnitude that are easily recognized by surveys made on the surface of the earth.

Hard-Rock-Country Surveys

In folded structures such as occur in northern Oklahoma much smaller differences in density exist between granite, Cambrian, Ordovician, and other deeply buried rocks than is found in the salt dome cases. Even though structures may have closures of several hundred feet in the Ordovician, only small gravity anomalies may be anticipated when known measured densities are used in the calculations. This has discouraged many operators from using the gravity method as freely in the hard rock areas as they have in the salt dome provinces. However, when careful gravity surveys are made over known structures it is usually possible to find gravity anomalies associated with the structures. Examples from two experimental surveys follow:

A Bouguer gravity map in the vicinity of Deer Creek and Webb pools in western Grant County, Oklahoma, is shown in Fig. 1. In an original survey made for a major oil company the station spacing was ½ mile with lines of stations run on section lines. It will be noted that a broad gravity nosing is located in the general vicinity of the two oil fields mentioned above.

An interpretation map is shown in Fig. 2 that is based on the original survey. It will be noted that a maximum closure falls between the two oil fields. At a later date, more gravity data were obtained in the area. A few lines of stations were run on section lines and half-section lines in which the station spacing was ⅛ mile.

Fig. 3 is a vertical gradient interpretation map derived from Fig. 1. The closer control has permitted resolution of the broad gravity nosing into two maximum anomalies caused by the two separate structures.

A Bouguer gravity map of Garber field, Oklahoma, is shown in Fig. 4. The contour interval is 0.1 milligal and the probable station error is about 0.02 milligal. Stations were spaced at an interval of 660 ft. on all section lines and most of the half-section lines within and adjacent to the oil field, the location of which is indicated by the dashed line. A gentle nosing of the gravity contours in the vicinity of the field is to be seen.

A vertical gradient map is displayed in Fig. 5. It will be noted that a north-south trend of maximum anomalies falls within the oil field.

A west-east profile is shown in Fig. 6 that falls along the "profile" marks of Figs. 4 and 5. The functions plotted are: (1) Bouguer gravity, (2) regional gravity, (3) residual gravity which shifts about 1 mile west, (4) the top of the Arbuckle limestone. (See "Garber Field, Garfield County, Oklahoma," by Wesley G. Gish and Raymond M. Carr, Structure of Typical American Oil Fields, Vol. 1, pp. 176-191). (5) The vertical gradient of gravity which gives an anomaly coincident with the Arbuckle uplift. Steep gradient on the east flank of Garber probably indicates faulting. (6) The second horizontal derivative of gravity, which gives a favorable anomaly over the Garber structure.

. . . and at its Limitations

by R. A. Weingartner

GRAVITY has three major limitations — (1) technical, (2) interpretive, and (3) psychological.

1. The technical limitation is terrain effect. Like a bad weathering factor in seismic work, a correction may be applied, but there is no assurance that the so-called correction is correct.

2. The interpretive limitation is inherent in any data based on a total field method. The separation of local anomalies, those of direct economic interest, from the regional gravity effect is always difficult and ofttimes impossible. This inherent limitation also appears on the many structures in which the amount and location of the deep-seated effect is sharply different from any greater than the shallower effect which is of economic importance. It accounts for the anomalies which fail to "shoot out" and are assumed to be too deep for present drilling methods. It accounts for many anomalies which are but partially conformable to the structure as later determined by shoot-

THE AUTHOR

R. A. Weingartner is geophysical coordinator for Stanolind Oil & Gas Co., Tulsa. He served as district geologist for Stanolind in Houston, geological supervisor of geophysical work in the Gulf Coast division, staff geologist in the geophysical coordinator's office in Tulsa, and as division geologist in Houston prior to assuming his present duties.

ing or other methods. Interpretation is further confused by the present lack of knowledge on subsurface densities and density contrasts in the stratigraphic section. Surficial density changes may produce anomalies suggestive of near surface faulting. Deeper contrasts at varied depths in the section make quantitative analysis of anomalies hazardous. Regional density changes provide false ideas of the regional strike and consequently of the regional geology.

3. At times, the most important limitation is psychological because of these reasons:

(a) The gravity measurements made and data shown cannot be converted to company-wide familiar geological terms. Contours in milligals simply do not "ring a bell" to management as do contours in terms of feet.

(b) Gravity interpreters are not always in agreement. Ofttimes preconceived ideas control the selection of anomalies. The varied interpretations which result do nothing to further confidence in gravity work. Unfortunately, a slight understanding of gravity is all that is required to qualify one as a critic or an expert.

Too many gravity discussions become extended defensive dissertations by the interpreter justifying the anomalies selected or of diplomatically explaining the weakness of those selected on the spur of the moment by the group at large. This is sharply different from the seismic approach where alternate anomalous possibilities on the seismogram constitute a record that ordinarily remains in the field and is not displayed on the map.

Finally, despite efforts to place the proper value on gravity when used alone or as an adjunct to other methods, there is generally an insistence that it must be compared to more direct and accurate methods or that it is either right or wrong. There is, then, a limitation which involves the failure to secure proper evaluation of gravity in consideration of its relatively low cost (one-fifteenth of seismic) and to secure a reasonable and proper utilization of a gravity as a tool for oil exploration.

Summation

In summation, gravity has the following limitations: The technical limitation is the terrain problem. The interpretive limitation is inherent in any data based on a total field method. This concerns such unsolved problems as those of differentiating between local and regional anomalies; of separating the shallow from the deep effect, and the erroneous anomalies and conclusions drawn as the result of local and regional changes in density. The psychological limitations are many and include those due to the inability to convert gravity measurements to familiar geological terms; to the loss of confidence resulting from the varied interpretations by the trained interpreter and the criticism and interpretation by the inexperienced interpreters; and to the failure to secure the proper appreciation and the proper utilization of gravity in oil exploration.

Pros and Cons of Gravity

by Paul Lyons, Moderator

Value of Regional Gravity

ALL the anomalies being sought are connected with larger anomalies in the earth's crust. No method is so well adapted for regional studies of any kind as the gravity method.

For example, there is available a gravity profile that goes practically around the world. The biggest gravity anomaly in the world, in area, is probably the Atlantic ridge. The biggest gravity value is probably that over Hawaii. Both of these features are basaltic, and not continental.

A gravity map of the United States on 100-milligal contours indicates that each large gravity anomaly is significant, just as each gravity anomaly on the world profile is significant. For example, a really significant regional low is found in the enigmatic Ouachita Mountain area. There exists a big high at the Idaho batholith and another at the extremity of the Gulf of Lower California, where a new basin is being filled. The strangest high of all starts in the Lake Superior region; continuing south, it roughly bisects the United States. It is almost certainly connected with the once mighty Nemaha mountains. This map also shows that the Bouguer value of zero follows the coast line of the continent.

In some cases gravity contours approximate structural contours, and in some cases they do not. In any case, they are significant. We should get away from the old idea that regional gravity contours should outline the basins. Of course what they really do is show tremendous density contrasts in the basement. I regard these basement contrasts as very significant inasmuch as they may affect the structure of the crust above them. These basement effects are the most prominent part of almost all gravity pictures, and they all add to the "regional" which must be removed to find the residuals we habitually deal with. The earth is pockmarked with them, and they are more or less randomly distributed, like the craters on the moon.

Since North Dakota is temporarily more fashionable than Texas, geologically, it is appropriate to note the big regional anomaly 6 miles east of Baker-Glendive fold. This important anticline, 100 miles long, is obviously due to slippage between masses of different density along an old fault present in the basement. This fault, indicated by gravity, can be traced by gravity maps into the Black Hills, and sure enough, it is there on the surface.

Another example is the Urania maximum in Central Louisiana. It has a surface graben on top of it, and this low has obviously contributed to the formation of the several structures and oil pools on its flanks. We can speculate that the gravity maximum reveals a collapsed batholith.

The ultimate conversion of regional gravity pictures may take the form of fault mosaics; this may be done to show basement faults. The tendency of structures to cluster along major fault trends, and especially at the upturned corners of fault blocks, is generally recognized.

In view of these observations it is obvious that geophysicists should not fail to make use of the regional gravity picture by attaching significance to the regional gravity anomalies.

What's Wrong With Gravity?

Most people engaged in exploration will agree on the value of gravity work, on the accomplishments of the gravity

THE AUTHOR

Paul L. Lyons is exploration manager for Anchor Petroleum Co., Tulsa. As president of the Geophysical Society of Tulsa, he was moderator for the panel discussion of this symposium which was planned and arranged by L. Y. Faust, vice president and program chairman for the society.

meter, and on the potentialities and value of the gravity map. But, most exploration men are simply giving lip service to the method. They say they believe in the gravity method, but spurn opportunities to drill a well on a gravity prospect. Many wouldn't hesitate to drill a minimum that is obviously a salt dome—but those days are gone forever, at least on dry land. Not many believers would drill a positive gravity residual. I would not myself—but I would if I knew its pedigree.

Most geophysicists feel this way about gravity. Why? What is wrong with the use of the gravity method? That there is something wrong is indicated by the report made several months ago to the Geological Society of Tulsa by Alex McCoy. All the discoveries in the Rocky Mountain area in the last 3 years were ascribed to the seismograph. I suspect that some of them were due at least in part to gravity—but gravity was not given credit. Gravity obviously does not enjoy undivided confidence.

Look at most regional gravity maps with drilling of a wildcat in mind. This map is full of wiggles, any one of which may be significant. That some of them are is borne out by comparisons with structures. Are all the wiggles important? Unfortunately, they are not. Make residuals out of them, or second derivatives. The map is then full of eggs.

I heard the other day about a company who employed a geologist to throw darts at a blank map. The president remarked that this method of locating wildcats is a bit unscientific, but it works! We need somebody with darts to point out which gravity anomalies are the real McCoy. One obvious method is too eliminate all those with dry holes on them, but somehow this destroys confidence in the method, and one does not end up with a burning desire to drill.

There are two things to be done about this. The first obvious thing is to improve the meter, the surveying, and the meter reading—that is, to remove mechanical errors. The gravity method has suffered grievously from these errors. Many operators have peddled inaccurate data, to the detriment of the entire method. One leading textbook of geophysics presents a residual gravity picture of a well-known Oklahoma structure. The residual pin points the structure. The residual is such a whopper, however, that the causative mass would have to have a density of 20 where the structure is present in the section. Drilling did find oil, but not gold. The data were inaccurate.

But, when we do remedy this, and when we detail areas, accurately, we are still going to find spurious structures, and it is still going to be very hard to distinguish the wheat from the chaff. To my knowledge, not many people are doing much about this—and those who do are not writing papers about it. These many residuals are in some part due to surface differences in density.

The classic figures in the texts show many shapes of structures at various depths in the subsurface, and great amounts of mathematics are devoted to deriving the gravity expressions of these shapes. But I wish to point out that geological conditions also impose a bewildering variety of density variations on the surface of the earth. Because of the inverse square law, these surface differences really operate with telling effect on the gravity picture, and they loom far more important than subsurface differences in density at depth. To call your attention to a few—what about a stream canyon filled with alluvial material or sand—or an outlier of heavy or light rock? What about outcrops of various formations, winding irregularly across country over hill and dale? About the most that was formerly done about this surface stuff was to try to find a density correction that would fit the area best. Once this factor was arrived at, the whole survey

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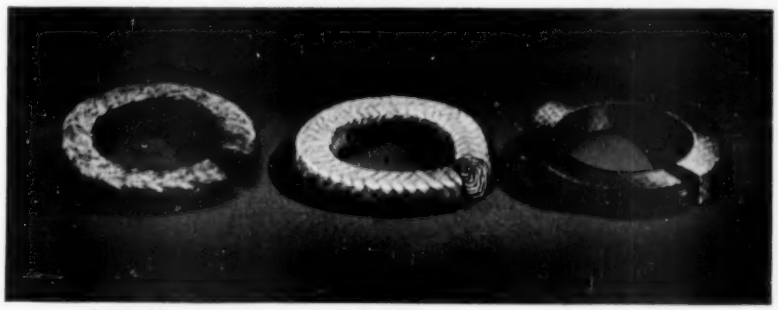

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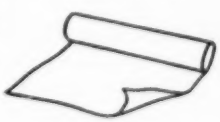

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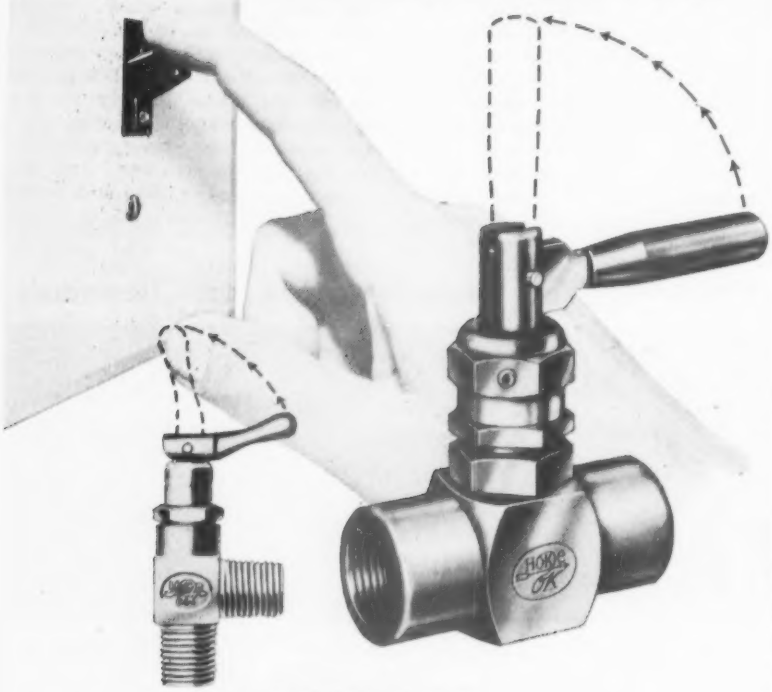

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could continue without a change of the density factor. We like to establish a routine and ride the rut. And so, when we find Residual number 275, we may not be finding a structure—we may be finding a hill, or a stream meander, or a sinkhole, or a glacial boulder, or a near-surface sandbar.

The solution lies in knowledge of densities, and application to surface rocks especially. Ways must be found to vary the elevation density factor in accordance with surface geology. This is quite a large order, but I believe that operations are going on at the present time to make this type of calculation possible. For example, Stanolind Oil & Gas Co. has taken the lead in attempting to organize a group of companies to undertake density logging of wells. I believe that the use of punched-card techniques and electronic calculating machines will simplify the laborious calculations necessary to utilize density control.

What is to be gained? We are enabled to throw out the residuals not due to the structures we seek, and we are enabled to retain those which are real in the picture. When we reflect that nearly all structural anomalies introduce some kind of gravity field by virtue of the different densities involved, then by the proper study of gravity we have an inexorable method of finding these anomalies, provided only they approach the size we can measure with a meter. I am convinced of this by a lengthy calculation we once made of a hundred square miles of Oklahoma geology. All the surface and subsurface geology known were collected, densities assigned to the various layers, and the gravity effect was calculated by finite graticules for this geology all the way down to the basement, layer by layer, section by section. The resulting picture checked almost perfectly the residual gravity from a meter survey, with one exception. On the survey map, a curious thumb extended east from the Lucien structure. When drilling discovered there was such a thumb there, the check was complete.

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PROBLEMS IN HYDROCARBON EXTRACTION—1

Accurate thermodynamic data required in design for greater recovery of ethane and propane

by D. L. Katz,* R. H. Schatz,* and B. Williams*

THE growth of an industry always provides a frontier where new processes are being tried to improve efficiency and reduce costs. The recovery of greater amounts of propane and ethane from natural gas is one of the frontiers for the natural-gasoline industry. Designs for this deep extraction create areas where there is a dearth of thermodynamic data even though there has been produced a large volume of significant information for the usual design problem.

A brief review of data available on vapor-liquid equilibria, densities, viscosities, and thermal properties is given here. The deficiencies in the data significant in deep extraction are noted. In general, thermodynamic properties are most unpredictable at pressures approaching the vapor-liquid critical pressure and data are insufficient in the low temperature region, i.e., —50° to —150° F.

*University of Michigan. Paper given at N.G.A.A. meeting, Houston, 1953.

DEEP EXTRACTION . . . This is Part 1 of a University of Michigan report on data available for "deep" extraction of ethane and propane. Vapor-liquid equilibria are covered in this section. Part 2 will appear in an early issue. The bibliography will appear with Part 2.

Operating pressure is probably the most significant variable in determining the nature of an extraction process. The composition of the natural gas from which the liquefiable hydrocarbons are being removed is also important.

Table 1 gives gas compositions and likely operating pressures.

Phase Equilibria

Many measurements of equilibrium vapor and liquid compositions have been reported since ideal equilibrium constants ($K = y/x$) were computed from fugacities.[7,40] There have been numerous correlations of data. A complete bibliography of phase equilibria would fill a book.[16] However, a group

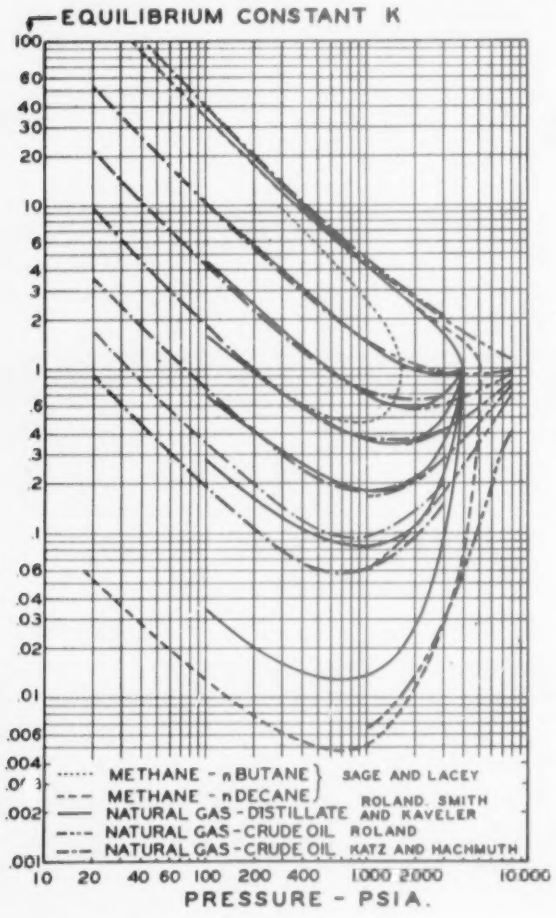
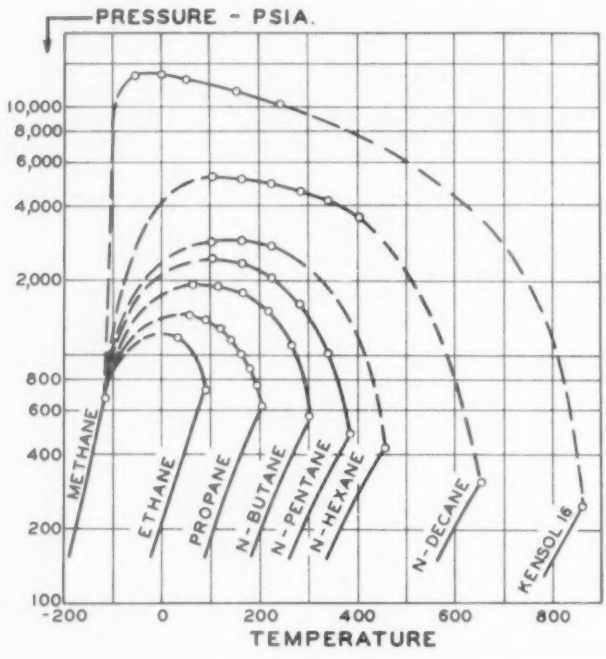


Fig. 1—Vaporization equilibrium constants at 200° F. (From Rzasa and Katz, "Science of Petroleum," Oxford University Press).

Fig. 2—Critical loci of binary hydrocarbon systems containing methane.



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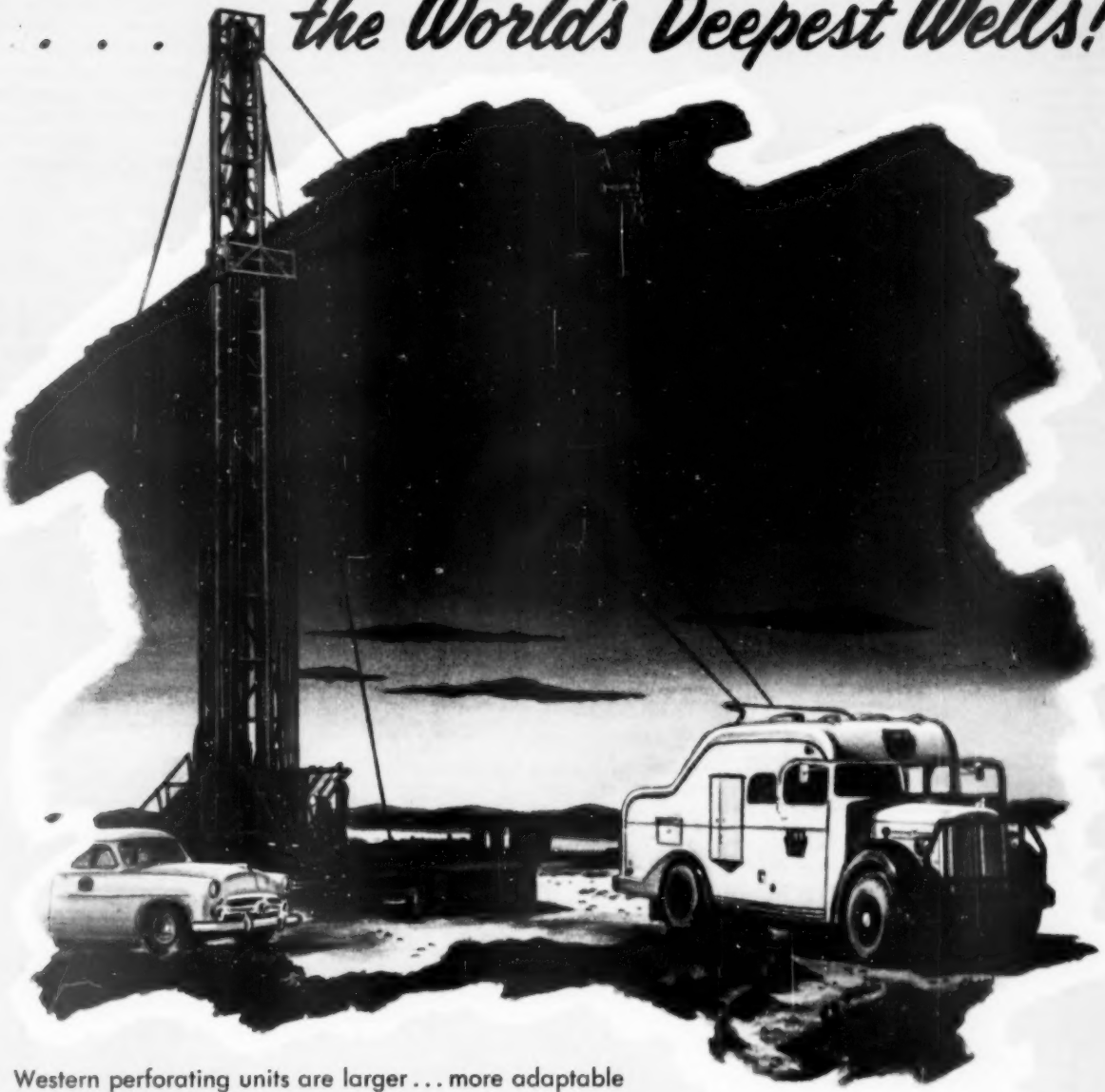

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TABLE 1—TYPICAL CASES FOR DEEP EXTRACTION

	Cycling	Natural gasoline	Pipe line
Pressure range, psi.	1,800-2,200	300-600	400-1,000
Gas Analyses—Mol Fraction			
Methane	91.46	65.11	94.91
Ethane	4.59	21.78	3.31
Propane	1.92	9.33	0.87
i-Butane	0.36	0.89	0.13
n-Butane	0.51	2.00	0.16
i-Pentane	0.21	0.30	0.04
n-Pentane	0.13	0.37	0.02
Hexanes plus	0.72	0.22	0.16
Carbon dioxide			0.40

TABLE 2—SELECTED REFERENCES FOR VAPOR-LIQUID EQUILIBRIA

Type of research—	
Crude oil-natural gas systems	17, 30, 32, 33, 42
Absorber oil-natural gas	22, 35, 37, 38, 39, 45
Condensate-natural gas	15, 20, 31, 34, 37
Binary systems	13, 19, 37, 38
Low-temperature data	11, 12, 13, 43, 48
Effect of nonhydrocarbon constituents	1, 12, 30, 31, 38
Correlations of data	7, 11, 14, 16, 20, 26 40, 47

of selected references are segregated by subject in Table 2. For many problems crossplots of experimental equilibrium data provide satisfactory information for process calculations. In others, correlations of data may be very useful.

The most difficult problems today are those in which the mixtures are at high pressures relative to the maximum two-phase or critical pressure for the mixture. The nature of hydrocarbon systems encountered in extraction and the method of treating problems of this kind will be discussed.

Apparent convergence pressure . . . The method of plotting vaporization equilibrium constants which seems most useful when comparing systems at high pressure is the isothermal log K versus log-pressure chart, Fig. 1. At low pressures, the ideal equilibrium constants may be used. They nearly follow Raoult's law as lines of slope minus one through the point of vapor pressure at $K = 1.0$.[16]

At some high pressure the K's approach the value of 1 at a critical or apparent convergence pressure. This convergence pressure depends upon the difference in volatility between the more volatile and less volatile components as shown by the critical loci for binary systems, Fig. 2. Thus the methane-butane system at 200° F. has a convergence pressure of 1,700 psi. while the methane-decane system converges at 5,000 psi. It is clear that the presence of two phases with methane as the more volatile component depends upon the presence of some less-volatile component.

Fig. 2 shows that propane cannot be extracted from methane at pressures above 1,500 psi. with vapor-liquid equilibria processes unless some

Equilibrium Constants . . .

component less volatile than propane is present.

Since 1937 one of the writers has been seeking a way to predict the nature of these K curves near the point of convergence. While associated with Standing[42] and Roland[13] on work at pressures to 9,000 psi., and having the Webber paper for study,[45] it became evident that the constants may not approach unity in the usual manner for binary systems.

Correlations based on the convergence pressure concept make a major correction from the usual ideal equilibrium constants and account for the rapid rise toward unity at some high pressure. Methods may be available for predicting the apparent convergence pressure for complex mixtures but no completely reliable procedure has been evolved for all mixtures.

Cycling plants . . . Cycling plants normally require recovery processes to take place at pressures of 1,800-2,200 psi. since pressure reduction would require extra compression of the gas returned to the reservoir. The usual extraction process uses oil absorption at temperatures just below cooling-tower temperatures but refrigeration may be employed. The hydrocarbon system under consideration is essentially that of

Fig. 3—Equilibrium constants for natural gas-absorption oil systems at 90° F.

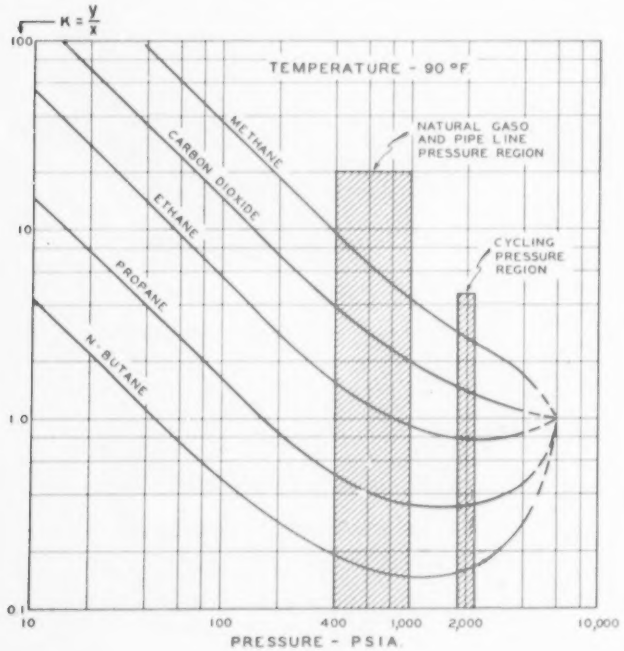
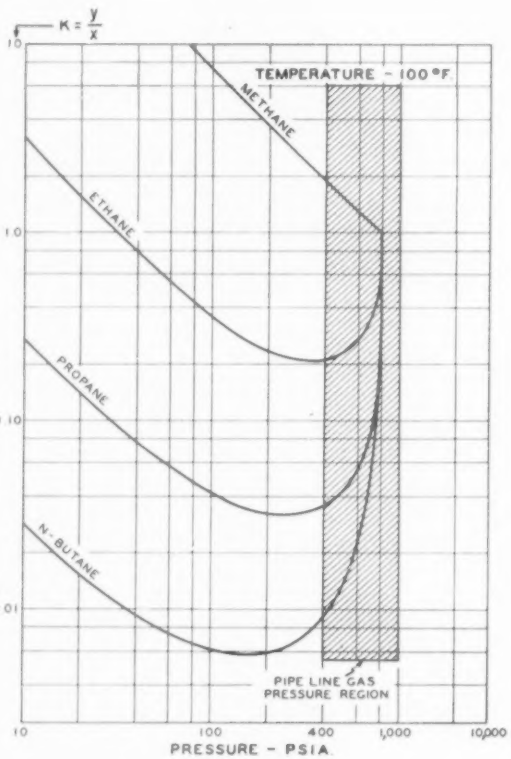


Fig. 4—Equilibrium constants for natural-gas systems at —100° F.



absorption oil, methane, and the constituents to be extracted. If the system were methane and absorption oil, the two-phase region would occur at pressures to over 10,000 psi. and the amount of intermediate constituents is not likely to reduce this value significantly.

Fig. 3 shows the position of the pressure range for cycling plants on the isothermal equilibrium constant plot. The nature of the absorption oil can become important.[22] Large amounts of nonhydrocarbon constituents cannot be neglected, but the degree of extraction of intermediate constituents has little influence on the equilibria as a natural gas consisting only of methane is approached.

Pipe-line separations . . . The extraction of ethane and propane from natural gas in transit to the utility market presents somewhat different problems in extraction. The pressure range normally is below 1,000 psi., the maximum pipe-line pressure, and is above the suction pressure for a line compressor station. These plants can provide a ready source of ethane and propane at great distances from the producing field without facing the transportation problem for ethane.[21]

If a pipe-line extraction plant were to use an oil-absorption process at temperatures above 0° F. the usual equilibrium data would apply. For low-temperature plants such as is used at Greensburg, Ky.,[21] the equilibrium data are likely to be in the pressure region in which the behavior cannot be predicted with accuracy.

Fig. 4 illustrates the type of equilibrium constants which might be expected for the pipe-line gas of Table 1 under flash vaporization. Should direct distillation of the gas be considered, the operating temperature for complete removal of ethane would be around —120° F. for a pressure of 630 psi. At this pressure, the equilibrium constants for calculations at the top of the tower would come from the methane-ethane system. (Institute of Gas Technology has determined methane-ethane system. Its presentation was scheduled for research conference at University of Michigan, July 1 and 2, 1953.) The variation in convergence pressure with changes in concentrations of intermediate constituents or nonhydrocarbons is not easily predicted. It follows that the equilibrium constants are very sensitive to composition, especially at the higher pressures in this range.

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Figure 2 shows the construction of the heavy duty Neoprene stripper. This stripper permits running and pulling tubing without the use of additional blowout preventer equipment. The one piece rubber packoff is molded into a steel spider ring to prevent stripper motion while the tubing is being raised or lowered. Tubing collars are passed readily; well pressure is sealed in effectively.

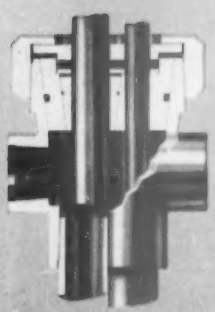

Figure 1 — Tubing Head with Gas Lift Hanger.

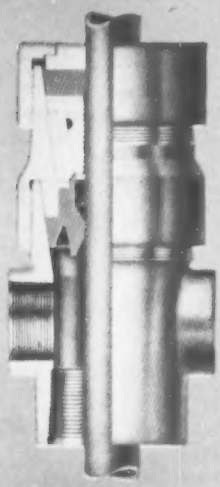

Figure 2 — Stripper Type Tubing Head.

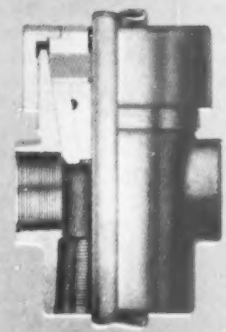

Figure 3 — Slip Suspension Type Pumping Head.

The head, as shown in Figure 1, can be converted to a gas lift head by removing the stuffing box assembly, slips, slip bushing, slip bowl, and stripper assembly, and substituting a gas lift hanger. The gas lift hanger utilizes slips for suspension of the gas pipe and is threaded for the tubing connection.

The ease of conversion to an efficient pumping head is shown in Figure 3. The stripper assembly and slip bowl are removed. The slip assembly is seated in the body of the head, and the stuffing box is made up on the body of the head instead of on the slip bowl.

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to process, Table 1. However, as extraction by absorption becomes "deep," the phase behavior is dictated primarily by methane and the absorbent. Thus, for such plants, the equilibrium constants are not sensitive to the degree of absorption since the pressures are far removed from any convergence pressure.

For processing with deep extraction by refrigeration, the system at the significant separation point again is primarily methane and ethane.

Effect of nonhydrocarbons . . . The effect of the presence of N_2 or H_2 on the equilibrium constants is that these constituents raise the convergence pressure markedly and thereby lower the volatility of ethane and propane. Table 3 shows the ethane and propane equilibrium constants in the binary systems with hydrogen to be about 20 per cent of that in the hydrocarbon system of Fig. 4 for a condition of 600 psi. and —100° F. It follows that even moderate concentrations of nonhydrocarbons cannot be neglected at these pressures.

TABLE 3—EFFECT OF HYDROGEN ON EQUILIBRIUM CONSTANTS AT 600 PSIA. AND —100° F.

	Propane	Ethane
C_1–C_2–C_3 system, Fig. 4	0.056	0.27
Hydrogen binary	0.009	0.050

Solidification of carbon dioxide . . . At low temperatures, carbon dioxide-hydrocarbon systems precipitate solid CO_2.[14] At temperatures down to —120° F. or lower, no solidification will occur for the CH_4–CO_2 system with mixtures having less than 5 mole per cent CO_2 at pressures below 500 psi.

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Texas Stripper Rod Pumps are available in a wide range of plunger and barrel tube combinations through leading stores in all major producing areas. Illustrated bulletins giving full information on these and other Harbison-Fischer pumps are available without obligation from our factory representatives or by writing us at P. O. Box 127, Fort Worth, Texas.

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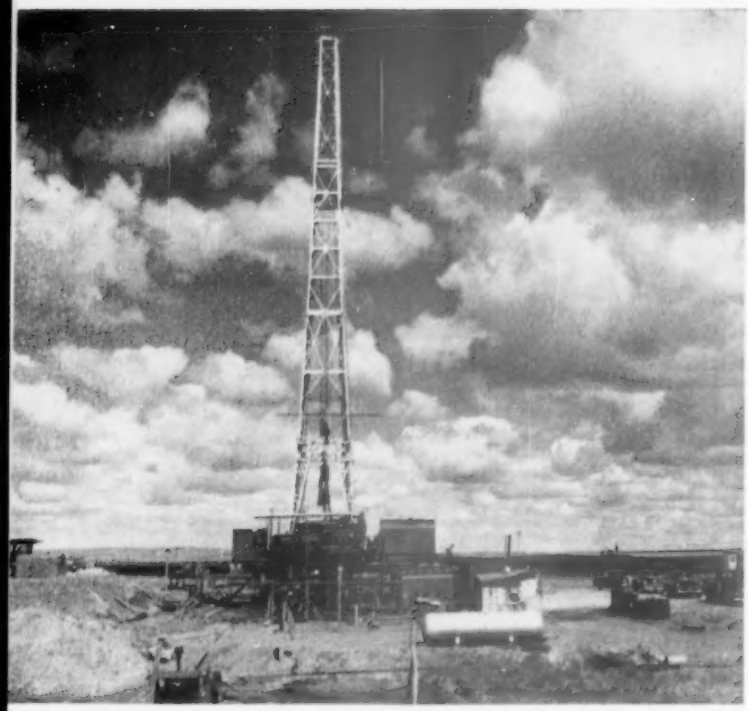
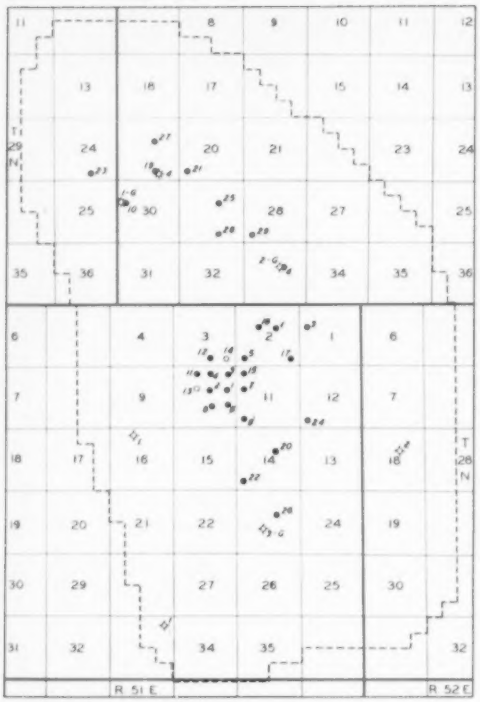


TYPICAL DRILLING OPERATION in East Poplar field is this Cook Drilling Co. rig working for Murphy Corp., unit operator.



FIELD DEVELOPMENT in East Poplar area has been proven for more than 6 miles along a northwest-southeast direction.

MONTANA PROGRESS REPORT

East Poplar Proved for 20 Square Miles

Fast-growing area commands field interest on Williston basin's west rim

by Joseph A. Kornfeld
Mid-Continent District Editor

MORE than 20 sq. miles have been proven for production during the past 25 months in East Poplar oil field, Roosevelt County, Montana. This fast-growing area, lying on the west rim of the Williston basin, extends for more than 6 miles along a northwest-southeast direction. Productive limits of the field, however, have been determined only in the southern part by dry holes.

East Poplar field is situated 32 miles northeast of Richey oil field of Dawson County, Montana, nearest oil production. About 96 miles due east of East Poplar lies a cluster of fields on the Nesson anticline in Williams, Mountrial, McKenzie, and Burke counties, North Dakota.

Current production . . . As of July 1, 1953, there were 26 completed oil wells productive from one or more zones of porosity in the Mississippian Madison limestone from a depth of about 5,700 ft. Of these wells, 21 are operated by Murphy Corp., of El Dorado, Ark., operator of the East Poplar Unit; 4 by C. C. Thomas, Denver, and 1 by Empire State Oil Co.

Most recent field extension is the latter's 1 State-Smith, C S½ SW SE 8-29n-51e, located outside of the East Poplar Unit and approximately 2 miles north of the nearest unit oil well.

Latest development in the field is announcement of location for a 6,200-ft. Madison test 1½ miles northwest of nearest production. It is Richfield Oil Corp. 1 Iron Bear, C SW NE 12-29n-50e, which is situated midway between Ajax Oil Co. 1 McGowan, C SE SW 10-29n-50e (completed for 75 bbl. of oil per day on the pump) and Empire State Oil Co. 1 State-Smith discovery, completed for a reported initial flowing production of 3,648 bbl. of oil per day.

Currently, East Poplar Unit is producing approximately 46,000 bbl. of oil per month. Production rate is determined solely by available marketing facilities and does not reflect combined capacities of individual wells.

East Poplar Unit . . . This was formed after the sale of a large block of leases on the structure by the Fort Peck Indian Agency in December 1949.

In addition to Murphy Corp., other major participants in the unit are Placid Oil Co., Shreveport; Carter Oil Co., Tulsa; and Phillips Petroleum Co., Bartlesville, Okla. Effective date of approval by the United States Geological Survey is August 23, 1951. Unit area comprises 34,143 gross acres lying in Townships 28 and 29 N., Range 50, 51, and 52 E. (See map.)

Current Drilling Operations

At this time, two contract rigs are operating for Murphy Corp. on de-

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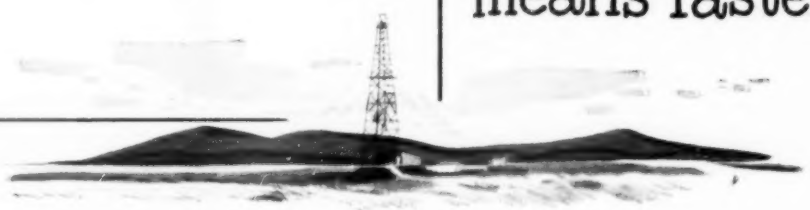

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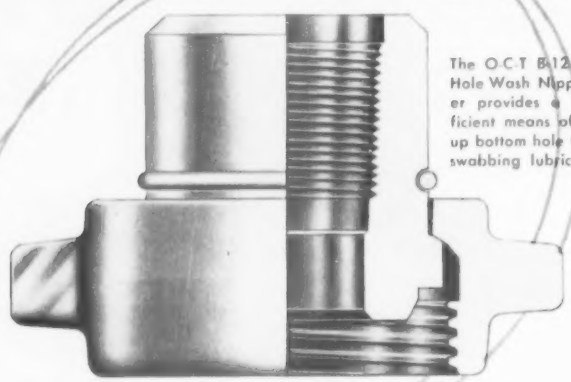

The O-C-T B-12-A Bottom Hole Wash Nipple Adapter provides a quick, efficient means of hooking-up bottom hole tester and swabbing lubricators.

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The O-C-T Type BT-14-A is a similar unit to the BC-14-A.

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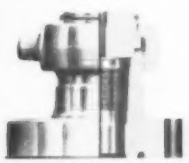

The O-C-T Type B-15-A Bottom Hole Test Adapter is designed for use where an integral flanged unit is preferred by the operator.

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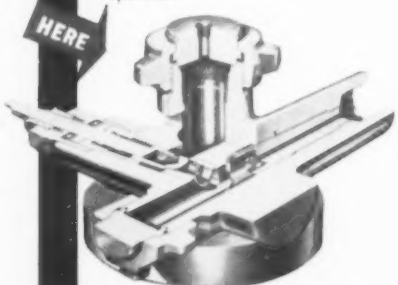

The O-C-T JE-1 Flow Control provides a single wing tree with the bottom hole pressure adapter integral.

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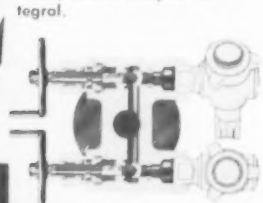

The O-C-T Dual Flow Control replaces 13 different fittings and makes it possible for the operator to switch the flow from one sized choke to another without closing in the well.

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velopment wells situated about 6½ miles apart on East Poplar structure. Contractors and rig descriptions follow:

Cook Drilling Co. . . . This contractor is currently working at 29 East Poplar Unit, SW SW 28-29n-51e. This rig is equipped with a draw works powered by two LRO engines rated at 750 hp., mounted on a 24-ft. by 9-ft.-high substructure and a 127-ft. jackknife derrick. Steel mud pits are employed. Pumps are one Model C-350 (7¼ by 14-in.) and one Model 150-B (6¾ by 14-in.) pump.

Cook also drilled the field discovery well, Murphy Corp. 1 East Poplar Unit, C SW NE 2-28n-51e, completed on October 21, 1951, for an initial calculated productivity of 625 bbl. of 40.6°-gravity oil per day through a ¾-in. choke.

Penrod Drilling Co. . . . This contractor is working at 28 East Poplar Unit, SW SE 29-29n-51e. Rig employed is a N-7 draw works powered by two diesel engines rated at 640 hp. Rig is equipped with a 129-ft. jackknife derrick mounted on a 24 by 43-ft.-base, 8-ft.-high substructure. Mud pumps are two Model WS 7¼ by 14-in. units.

North of the Poplar River, Cretaceous Judith River sandstone found at about 700 ft. carries high-pressure gas. In this area an 18-in. bore hole is cut in which a 13⅜-in. conductor pipe is set to a depth of from 100 to 150 ft., cement is circulated to surface.

Surface hole is cut with a 12¼-in.-bit through the Judith River sandstone to 1,000 ft. where 9⅝-in. surface pipe is set and cemented with 400 sacks of cement. In order to control gas found in the Judith River, mud weight is built up in some wells to as much as 13.7 lb. per gallon. In the south end of the field, where the Judith River sand carries no gas, a 12¼-in. surface hole is drilled with water but no conductor pipe is set. Surface pipe, using 9⅝-in. casing, is set at about 1,000 ft. and cemented with 400 sacks.

Mud program . . . Natural mud is used in drilling an 8¾-in. hole to about 4,500 ft., where a caustic-quebracho mud is started and maintained to total depth.

Porosity zones in the Mississippian Madison formation are diamond cored and drill-stem tested. Long string of 5½-in. casing is set through all possible pay zones and cemented with 250 sacks. Rotating-type scratchers and centralizers are used on all long strings.

Completion Procedure

Normally, producing zones are perforated with four jet shots per foot. Water is then introduced into the hole to displace drilling mud. Perforated interval is acidized with 1,000 gal. of regular 15 per cent acid through 2⅜-in. tubing. Single-zone completions are made without production packers.

Tight pay zones are encountered in some wells in the field. In these cases, acid treatment of 1,000 gal. is followed with Stratafrac treatment employing 1,000 gal. of gel-acid and 2,000 gal. of regular acid. A typical single-zone completion, 22 East Poplar Unit, C SW SW 14-28n-50e, flowed at the rate of 484 bbl. of oil per day with 14 per cent b.s. and w. through a ½-in. choke following acid treatment with 1,000 gal.

Gathering system . . . Oil produced by the unit is transported from lease tank batteries to a loading rack through a network of 4 and 6-in. gathering lines. About 6½ miles of 4-in. line connect tank batteries with two central pump stations. These stations are equipped with electric-driven Model 1755 pumps to handle more than 500 bbl. of oil an hour.

An additional 6½ miles of 6-in. line carry oil from pump station to two 5,000-bbl. storage tanks from which oil moves by gravity through a 6-in. line for 1½ miles to the unit's 20-tank-car loading rack at Sprole siding on the Great Northern Railroad.

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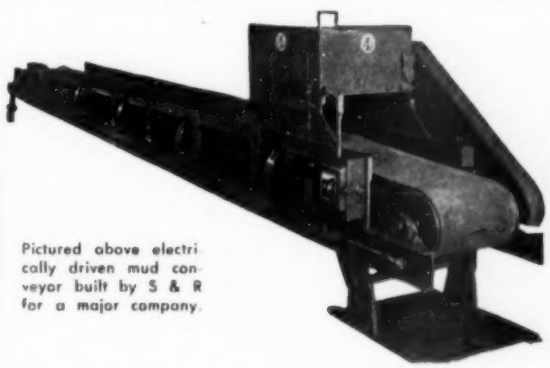

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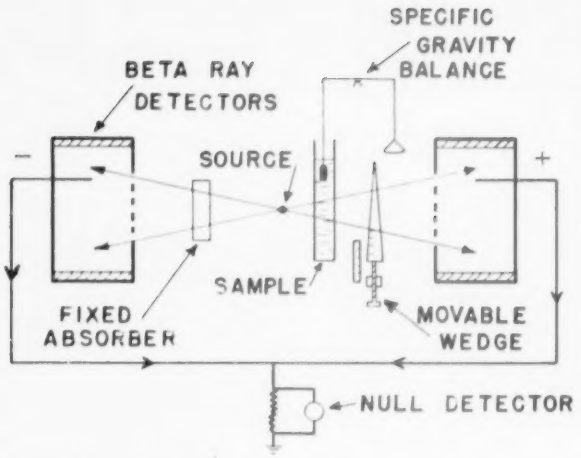

Fig. 1—Schematic illustration of principle of beta ray instrument used to determine per cent hydrogen in liquid hydrocarbons.

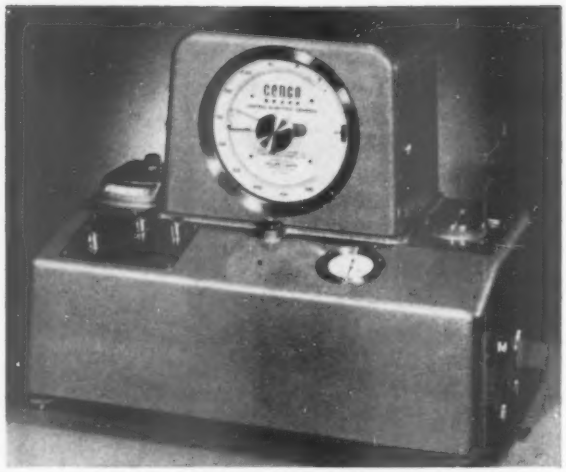

Fig. 2—Beta ray absorption rate is measured by this new instrument.

REFINING POINTERS

Speedy, Accurate Hydrogen Measurement

New instrument uses beta rays to determine H percentage

by Robert B. Jacobs and Lloyd G. Lewis

THE percentage hydrogen in liquid hydrocarbons can be determined by making two simultaneous measurements on the sample to give (1) density and (2) the absorption rate for beta rays. The weight percentage of hydrogen in the sample is computed from these measurements and a calibration curve. Performance of a pilot-model instrument indicates that individual determinations can be made in an elapsed time of 5 minutes with a statistical probable error of 0.02 weight per cent hydrogen. Corrections, which are usually of small magnitude, can be made to take into consideration the presence of oxygen, nitrogen, sulfur, lead, etc.

Rapid Method Means Many Applications

The percentage hydrogen in a hydrocarbon, or alternately the H/C ratio, are basic properties used principally by petroleum chemists in fundamental research work. High-precision techniques based on combustion analysis have been used for their determination. These methods require considerable time and a skilled operator. Hence, hydrogen percentage and the H/C ratio are seldom used in the petroleum industry except in the field of fundamental research.

Authors are in the engineering research department, Standard Oil Co. (Ind.), Whiting, Ind.

Wider application . . . It is generally recognized that many refining operations result in an alteration of the percentage of hydrogen. For example, the hydroforming operation has as its objective the removal of hydrogen to produce aromatics from paraffins and cyclo paraffins. The solvent extraction of lube-oil stocks removes the aromatics by selective solvents, thus increasing the percentage of hydrogen. In addition, the percentage of hydrogen is an index to the performance of such petroleum products as fuel oils, jet fuels, etc. For these reasons, a rapid method for measuring this basic property should find widespread use throughout the petroleum industry for plant and product control as well as for research work.

Beta ray absorption . . . The instrument described here makes use of the absorption of beta rays. These beta rays, which are high-speed electrons, are obtained from the radioactive decay of strontium 90. These rays are slowed down or absorbed primarily by colliding with the electrons contained in the materials located along their paths. Accordingly, hydrogen, which contains approximately twice as many electrons per unit weight as does any other element, absorbs beta rays more efficiently on a weight basis than do the other elements.

How New Instrument Works

The instrument which has been developed is illustrated schematically in Fig. 1. The beta-ray source is constructed to radiate equally in the two directions indicated. The beam to the **left** first traverses a fixed absorber, then proceeds to a beta-ray detector which in the present case is an ionization chamber. This chamber is arranged to collect negative electric charge on the central electrode. The equal beta ray beam radiated to the **right** of the source in Fig. 1 traverses a sample cell and a wedge-shaped absorber before entering the other beta ray detector. A galvanometer is provided to indicate the **difference** in the magnitude of the electric currents produced in the two ionization chambers. A balance is provided to measure simultaneously the density of the liquid sample, by the usual weight displacement method.

Experimental procedure . . . The sample cell (10 cc. capacity) is filled with the unknown hydrocarbon. Then the wedge is moved until the galvanometer

indicates that equal currents are produced in the two ion chambers. When this is done, the absorption of the sample in the cell plus that of the wedge is equal to that of the fixed absorber. The position of the wedge is recorded and used as a measure of the absorption in the wedge. The density of the sample is determined by weighing a glass capsule submerged in the liquid in the usual manner.

Principle . . . In a rough way, the method may be explained as follows: Assume for simplicity that the sample contains only carbon and hydrogen. Then, since the absorption of the radiation is due almost exclusively to the electrons in the sample and since hydrogen contains twice as many electrons per gram as does carbon, the absorption (or wedge position) can be expected to be a function of:

$$\text{Weight of carbon/cc.} + 2 \text{ weight of hydrogen/cc.} \quad (1)$$

Now, a simultaneous measurement of density gives:

$$\text{Density} = \text{weight of carbon/cc.} + \text{weight of hydrogen/cc.} \quad (2)$$

Then from these two relations, one may solve for weight of hydrogen per cc., which is the desired quantity.

Relation 1 above holds strictly only for very hard radiations, such as the gamma radiation from a cobalt 60 source. For sources of moderate hardness, such as the beta radiation from strontium 90 as used in the present instance, the quantity "2" in expression (1) should be replaced by an empirically determined quantity which is somewhat less than 2.

The above procedure used with the machine shown in Fig. 2 yields results in 5 minutes elapsed time that have a statistical probable error of 0.02 weight per cent. The procedure is sufficiently simple so that satisfactory measurements can be made by a technician.

Note that carbon and hydrogen in organic materials are normally determined by the combustion method. Here the experimental time required per sample varies from 1 to 4 hours and the probable error, expressed in weight per cent hydrogen, is generally regarded to be about 0.05 per cent at minimum, although some authors claim considerably better accuracy for the method.

If the sample contains chemical elements other than hydrogen and carbon, the above procedure will give a value for the per cent hydrogen that is too high by an amount dependent on the quantity of other elements present in the sample. For example, 5.4 per cent of the weight per cent oxygen present in the sample and 25.4 per cent of the

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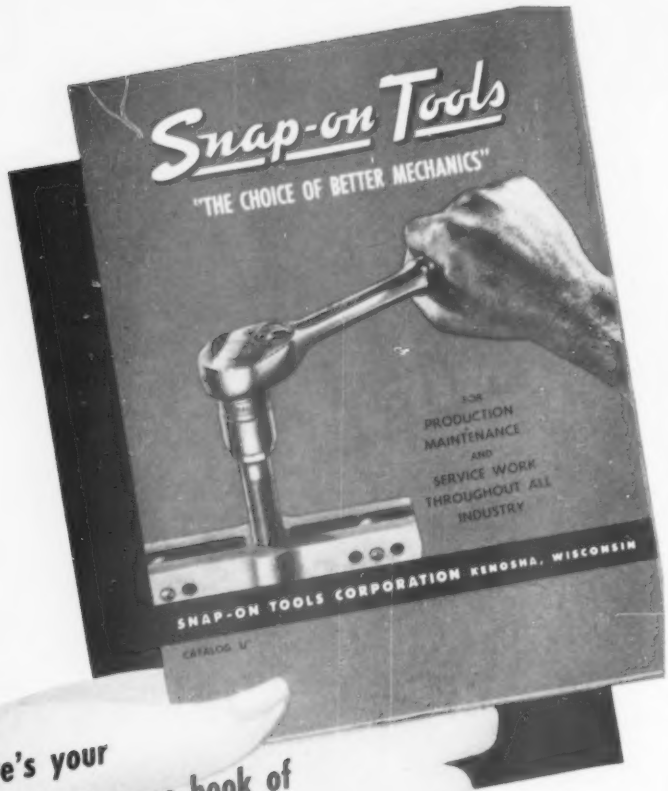

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weight per cent of sulfur present in the sample should be subtracted from the per cent hydrogen obtained by the procedure described above to obtain the true per cent hydrogen. For most samples from the refinery, the only significant correction is the one for sulfur. This instrument has been licensed under patent rights of Standard Oil Co. (Ind.) for commercial manufacture and sale by Central Scientific Co., Chicago.

Bay Petroleum Improves Quality

(Continued from page 97)

gas-concentration plant. The gas-oil bottoms from the visbreaker fractionator are heat-exchanged against crude oil and sent to storage.

Visbreaker flash chamber bottoms are fed to the vacuum column which has nine alloy side-to-side pans. Vacuum gas oil is separated here from the visbreaker pitch. The vacuum column makes light-vacuum gas-oil overhead and heavy-vacuum gas oil as a side draw.

The charge stock to the new cat cracker is thus comprised of atmospheric gas oil from the crude unit, visbreaker gas oil, and vacuum gas oil.

Catalytic Cracking

The high-conversion cat cracker is of the latest U.O.P. design, with one single-stage cyclone in the reactor and two single-stage cyclones in the regenerator. The main fractionator has 10 alloy bubble decks. Light cycle oil is taken off through a side-cut stripper.

Gases and gasoline produced in this new unit are sent to the gas-concentration plant, where all the gasoline portions from the gases are recovered as well as propane-propylene and butane-butylenes for the poly plant charge. Propane and propylene recovery is very high, running 86½ per cent, while butane and butylene recovery is essentially 100 per cent.

Gas concentration . . . The gas-recovery section consists of a primary and secondary absorber, a stripper column and a debutanizer. The primary absorber was originally used as the reformer debutanizer and has 26 cast-iron bubble trays. The secondary absorber, formerly employed as the absorber in the thermal cracking gas-concentration plant, has 12 cast-iron bubble decks. Stripper and debutanizer columns have 24 and 28 steel bubble trays, respectively.

Gases are compressed to a high pressure and sent to the primary absorber. Liquid from compressor interstage and high-pressure receivers goes to the stripper, where ethane, H_2S, and

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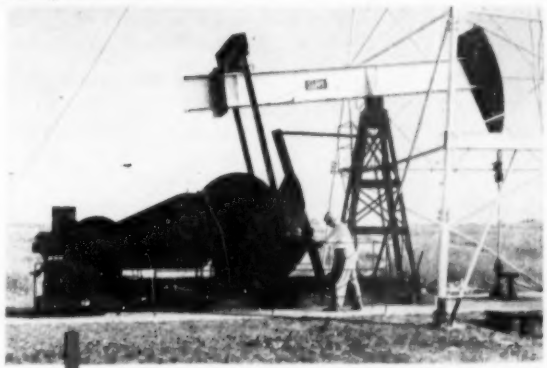

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lighter materials are removed. Liquid from the low-pressure receiver is used as lean oil over the primary absorber. Rich oil from the absorber and vapors from the stripper are recirculated through the high pressure receiver stripper charge surge drum for reabsorption.

The recovered liquid is debutanized. Overhead fractions of C_3 and C_4 are sent to the poly plant. Bottoms go to cat cracked gasoline storage. Recovery of C_3 and C_4 and rejection of C_1 and C_2 materials is independently controlled.

Catalytic Polymerization

A caustic and water-wash system was provided to remove materials which might poison the poly catalyst. Towers packed with ceramic Raschig rings are employed for this service.

Finned tube sections, taken from other units in the refinery that were idle, were placed on the charge exchanger, charge heater and effluent cooler. The former deethanizer reboiler is used as the poly charge heater and the present reactor effluent cooler was originally employed as the thermal reforming debutanizer condenser. The poly depropanizer is a 28-tray (steel bubble decks) column. Depropanizer bottoms are stripped in a column packed with carbon Raschig rings while the poly deethanizer column is packed with ceramic rings.

Provision was made for using the catalyst chamber effluent as part of the liquid recycle because the existing fractionating columns did not have sufficient capacity to handle the required amount of the propane and butane recycle fluid. For the same reason, the deethanizer column was moved from its position following the catalyst tower to a point beyond the depropanizer in order to handle the depropanizer overhead.

After caustic and water wash, the fresh feed is pumped through the effluent exchanger and charge heater into the catalyst chamber. Effluent passes through the charge exchanger, where it splits. One portion goes directly to the depropanizer and part goes through the cooler into the effluent receiver, where it splits again. Part of the material is sent to the depropanizer and part is picked up by a pump and used as recycle fluid.

As much propane recycle is used as is permitted by the capacity of the depropanizer. The remainder of the depropanizer overhead is charged to the deethanizer, where it is split into gas which is vented to the refinery fuel system and L.P.G. for sale.

Depropanized bottoms enter the poly stripper, where excess butane is removed overhead and 10-lb. polymer is produced as a bottoms product.

Universal Oil Products Co., Des Plaines, Ill., designed, engineered, and licensed the new cat cracker. The cat cracker was constructed by Procon Inc. Procon engineers also handled the revision of the poly and gas-concentration facilities.

It's Easy to Do Business in Arkansas

(Continued from page 99)

each producing formation and below all fresh-water strata, with the intervals filled with heavy mud. A special rule applying to seismic, core, or other exploratory holes drilled below the fresh-water formation requires plugging in such manner as to protect the water-bearing formation, and the operator has 1 year within which to file a report showing the method used.

Before any person is permitted to engage in the business of pulling casing from oil and gas wells in the state, a surety bond in the amount of $5,000 must be filed with the commission by that person to insure that wells will be properly plugged after pulling. Upon receipt of the bond, the commission issues permit to engage in the business mentioned. The permit or license is for a term coextensive with the bond, unless revoked because of noncompliance with the rules of the commission.

When any well is treated with explosives or chemicals, the operator must file, within 20 days, a copy of Form 6, or "Shooting, Perforating, or Treating Report," showing the method of treatment and the result, and precautions taken to protect the casing and the formation.

When a well is completed, the operator must file Form 8, or "Well Completion Form," within 5 days. Because this report is used as the basis for setting the well's producing allowable, it calls for considerable detailed information about the well, the method of testing, and the results obtained.

The commission's general regulations contain a number of rules which must be followed during drilling, completion, and production, all of which are now pretty much standard practice on the part of prudent operators. For example, it is required that water be kept out of oil-bearing formations and that freshwater sources be protected against contamination. The rules require that the equipment be adequate for the pressures expected, that precautions be taken against blowouts, that each string of casing be tested, and that various precautions be taken against fires.

Producing oil . . . Wells must be produced through tubing of not more than

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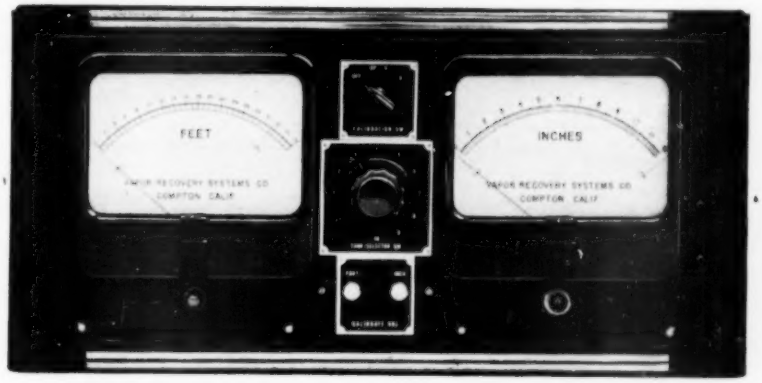

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2½-in. diameter, they must be operated in such a manner as to reduce the formation of emulsion and basic sediment, and flowing wells must be equipped with chokes and separators. Wells making 2 per cent or more of salt water must be reported monthly on Form 10½.

During the drilling of a well the operator must file, in the form of a letter, a report of deviation tests taken at 500-ft. intervals. Wells may not deviate from vertical by more than 3° to 5°, depending on the distance from the property line, and the commission can require an operator to make a directional survey to make sure that the well has not gone beyond the property line.

Dual completions may be made only after notice to the commission and in a manner approved by its director of production and its chief engineer. A dual completion is treated as a separate well, and requires an individual well permit and production allowable.

Developed oil and gas fields in Arkansas are divided into two classes: "controlled" and "uncontrolled." Uncontrolled fields are those which were discovered prior to January 1, 1937. They are stripper-well fields or fields of settled production, and in a recent typical month they produced 18,000 bbl. per day out of the state total of 86,000 bbl. per day. These fields are not subject to proration, but the purchasers of the oil have to make monthly oil-run reports. Also, drilling in uncontrolled fields requires a regular well permit and must be conducted in accordance with statewide regulations and applicable field rules.

In every controlled field each producer of oil or liquid hydrocarbon at the well head must file Form 7, "Producers Certificate of Compliance and Authorization to Transport Oil from Lease." This must be filed for each lease before production may start, and a refiling is required whenever the lease changes ownership or the transporter or purchaser of the oil is changed. When approved by the commission, Form 7 constitutes authority for the transporter named to move the oil or condensate in intrastate and interstate commerce.

Transporters are required to keep records of oil on hand and transported from each lease each month so that the commission can determine whether any illegal oil is being produced or moved. Illegal oil is oil produced in excess of the well's allowable or otherwise in violation of the commission's orders and regulations.

Every month every producer in controlled fields must file two reports: Form 9, "Producers Monthly Report," and Form 11, "Monthly Gas Report." These show production by wells, the assigned allowable, disposition, and in the case of oil the amount in lease tanks.

In controlled fields all operators must file an additional monthly report: Form 10½, "Well Status Report and Gas-Oil Ratio." This shows whether an individual well was operating or shut in, pumping or flowing, and gives the choke size, pressures, water and gas production, and gas-oil ratio.

Producers in controlled fields pay monthly assessments to meet operating costs of the Oil and Gas Commission. The commission is authorized to collect 5 mills per barrel of crude or wellhead liquid hydrocarbons, and ½ mill per thousand cubic feet of gas produced from controlled fields. Payments are made by the first purchaser at the lease and deducted from the amounts paid to the producers. However, 2½ mills per barrel of oil or liquid hydrocarbons has been sufficient to pay expenses required in the administration of the law. No assessment has been made on gas.

Special applications must be made and hearings held on all projects for disposing of salt water and for fluid repressuring and water flooding of oil and gas properties. Standards for such projects are described in some detail in the commission's general regulations.

Unitization . . . Arkansas has long had a requirement for compulsory pooling

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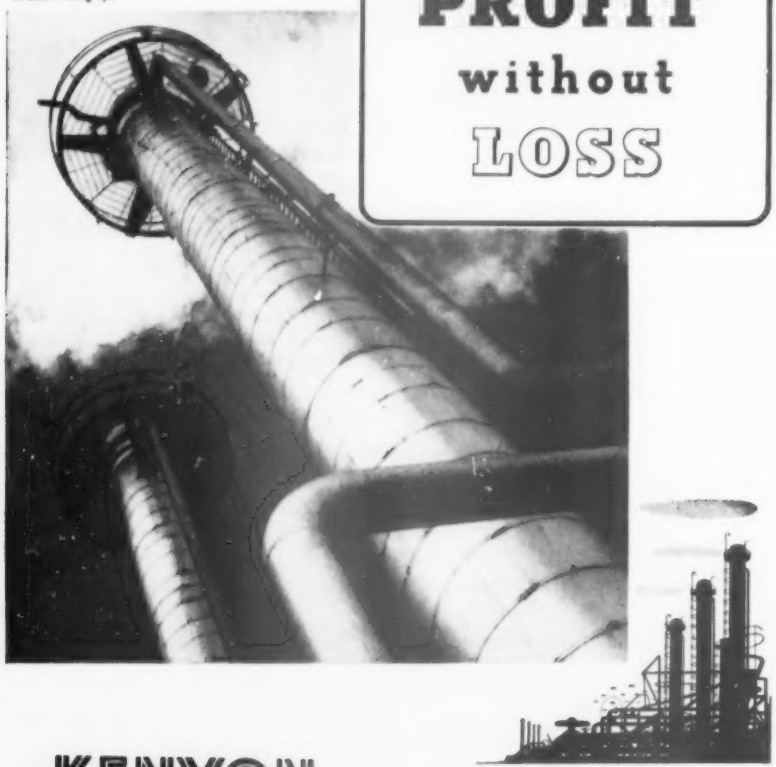

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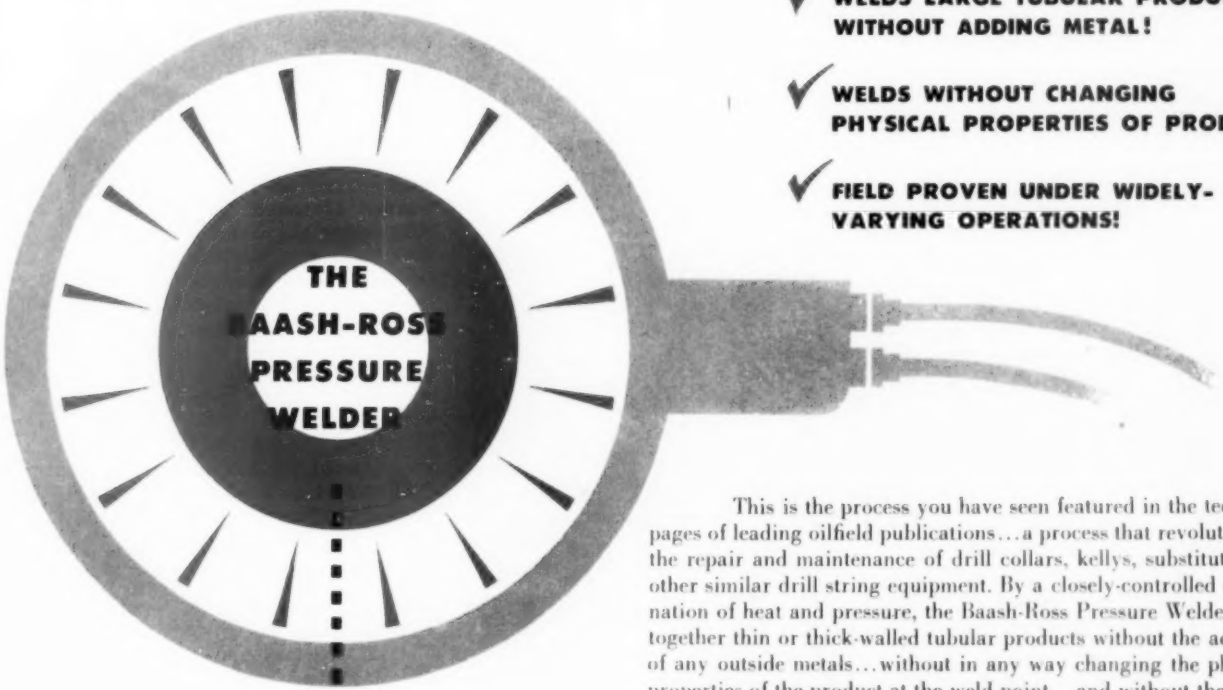

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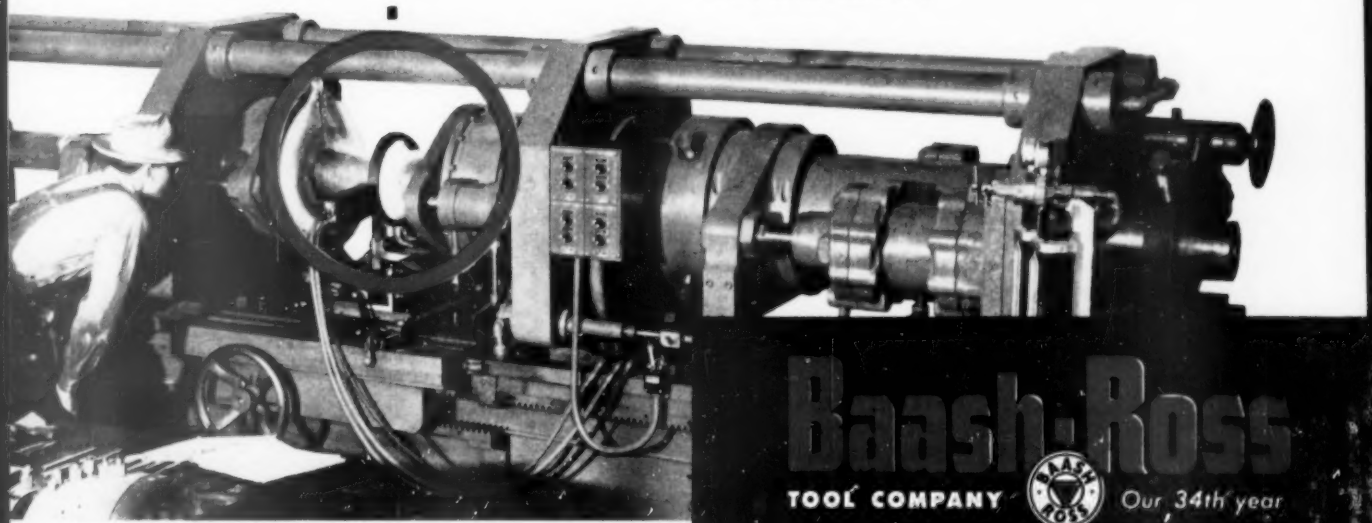

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of surface interests within a drilling or spacing unit, and has permitted voluntary poolwide unit plans without liability to prosecution under state anti-trust laws. In 1951 the state enacted a compulsory unitization law giving the commission power to require unit operation of a pool upon a showing that this is necessary to prevent waste. To date only one unitized project has been formed under this law, and it was accomplished without any serious opposition or legal difficulties.

The production of oil and gas from every well in all controlled fields is prorated by the commission to prevent physical waste. Arkansas has no market-demand proration statute. The usual practice of the commission is to issue a complete proration schedule every January, listing the daily and monthly production by pools and wells for the ensuing year. Quarterly proration hearings are held, and any additions for new wells or changes in existing schedule are covered by special supplementary schedules.

The potential open flow of all gas and combination wells in the state, except those with an open flow of 750,000 cu. ft. or less, must be determined at least once a year, and such wells must have pressure tests as often as necessary to determine the well's allowable and to provide for ratable taking. No well may produce gas in excess of the maximum gas-oil ratio set for the pool unless the excess gas is returned to the producing formation.

Producing gas . . . Within 7 days after encountering gas in a gas well, no gas may be permitted to escape into the air, and gas-well gas may be produced only for light or fuel, efficient chemical manufacturing (not including carbon black), reservoir repressuring, or extraction of natural gasoline provided the residue gas is utilized. Arkansas law flatly prohibits the manufacture of carbon black from gas.

Casing-head gas may be used for any beneficial purpose but if used for gas lift the gas used may not exceed 10,000 cu. ft. per barrel of oil produced except with special permission of the commission.

All gas produced in the state must be measured and accounted for on the "'Monthly Gas Report," Form 11. If the gas is taken from the well by the producer, this report must be filed by him, but if the gas is taken from the well by a pipe line or other person, except an extraction plant, the report must be filed by such person.

Field processing plants must report monthly on Form 12, "Gasoline or Other Extraction Plant Monthly Report." This shows the volumes of gas obtained from each oil well and each gas well, its disposition, sale of residue gas, and production of liquid products.

Any pipe line, field processing plant, or other project to utilize gas other than for lease fuel must have prior approval of the commission, and a hearing may be held to determine that the proposed use will not constitute waste of gas.

Pipe lines . . . All oil pipe lines and gathering systems also are closely regulated by the commission. No carrier may take oil from any operator who has violated any rule or order of the commission. To provide ratable taking of oil, the regulations require pipe lines to connect to lease tanks in rotation as wells are completed, regardless of ownership, and connections must be made by the pipe line which by geographical location and lease expense is the logical carrier unless some other carrier is willing to make the connection.

All pipe lines and other transporters and storers of oil in the state must file monthly reports on Form 13, "Transporters and Storers Monthly Report." This shows receipts from each producer and lease or other source, stocks at the beginning and end of the month,

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and the disposition of oil delivered.

The commission has authority to issue special regulations and orders relating to the erection and operation of any plant or factory separating products from oil or gas. Such plants also must file monthly reports showing the source of their raw material, stocks, products produced, and the disposition of crude oil. Refineries report on Form 14, "Refiners Monthly Report," while the operations of other types of plants are covered by Form 12.

Through this system of regulation and reports the Arkansas Oil and Gas Commission has the information and authority needed to prevent waste of oil or gas within the state and to make sure that no oil or gas may be transported or utilized in violation of any of its regulations.

BOOKS

PHYSICAL CONSTANTS OF HYDROCARBONS. Vol. 5. By Gustav Egloff. Published by Reinhold Publishing Corp., 330 West Forty-second Street, New York. 524 pp. $20.

Published as American Chemical Society Monograph No. 78, this new volume of a continuing series gives melting and boiling points, density, refractive index and critical properties for the aliphatic hydrocarbons, taking up in order paraffins, olefins and acetylenes. Purpose of the new volume is to bring up to date the data for aliphatic hydrocarbons previously collated in Vol. 1 of the series published in 1939. Attention is called by Dr. Egloff in the preface to the A.P.I. projects, which have been conducted in the period between publication of Vol. 1 and Vol. 5, concerned with accurate determination of physical constants of highly purified hydrocarbons. Particular mention is made of Project 44, directed by Dr. Frederick D. Rossini and Project 42, directed by Dr. R. W. Schiessler.

Previous volumes of the series covered:

- Vol. 1 (1939)—Paraffins, olefins, acetylenes and other aliphatic hydrocarbons.
- Vol. 2 (1940)—Alicyclic hydrocarbons including cycloparaffins, cycloolefins, cycloacetylenes and others.
- Vol. 3 (1946)—Mononuclear aromatic series.
- Vol. 4 (1947)—Polynuclear aromatic hydrocarbons.

CORRELATION BETWEEN SURFACE AND SUBSURFACE SECTIONS OF THE ELLENBURGER GROUP OF TEXAS. By Leo Hendricks. Published by University of Texas, Bureau of Economic Geology, as Report of Investigations No. 11. 44 pp. $2.50.

This report outlines the sample characteristics of the formations in the Ellenburger group recognized by a study of insoluble residues and a systematic discussion of residues is included. Detailed sample descriptions are given for the Gorman Falls section, San Saba and Lampasas counties; the Spicewood Creek section, San Saba County; and the Tanyard section, Burnet County. Correlation of Ellenburger sections in Central, North, North-Central, and West Texas is illustrated by several large charts which have been printed in color.

SELECTED VOLUMES OF PHYSICAL AND THERMODYNAMIC PROPERTIES OF HYDROCARBONS AND RELATED COMPOUNDS. Comprising the Tables of the American Petroleum Institute Research Project 44, Extant as of December 31, 1952. By Frederick S. Pitzer, Raymond L. Arnett, Rita M. Braun, and George C. Pimentel. Published for the American Petroleum Institute by Carnegie Press, Pittsburgh. 1050 pp. $7.

The A.P.I. research project reported here last year completed 10 years of work, operating at the National Bureau of Standards for 8 years, then at Carnegie Institute of Technology. The project serves as the central agency of the A.P.I. for collecting, calculating, and compiling data of interest to the petroleum industry, covering physical, thermodynamic, and infrared, ultraviolet, Raman, and mass spectral properties of hydrocarbons and all related compounds. Over-all purpose of the project is to maintain up to date a complete set of data, critically selected and internally consistent, on the physical, thermodynamic, and spectral properties of petroleum-derived compounds, to aid the petroleum industry to utilize its raw material to the greatest possible advantage. The present volume is a compilation of loose-leaf data sheets which are regularly distributed.

OBJECTIVE ACCOUNTING—A PROBLEM IN COMMUNICATION. By Carl F. Braun. Published by C. F. Braun & Co., Alhambra, Calif. 79 pp. $1.75.

Main theme of this little volume is that accounting is a mixture of fact and opinion, and that accounting is not properly recognized as a forceful means of communication. It points out that accounting should be useful to management in order to justify itself, that it should be understandable to the layman, that it should be realistic, predictive, and useful, and not a historical record only, overly concerned with minutiae and pennies.

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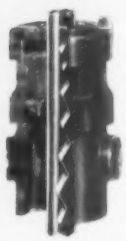

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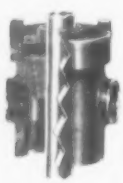

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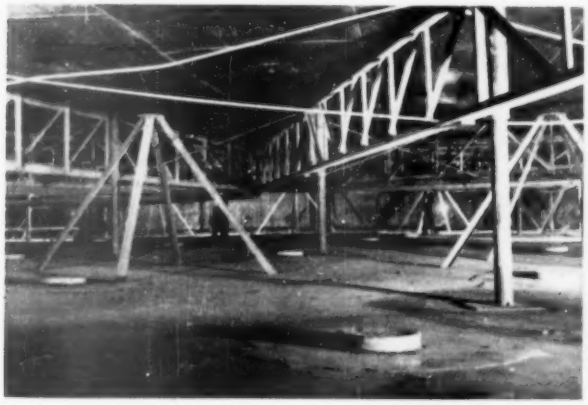

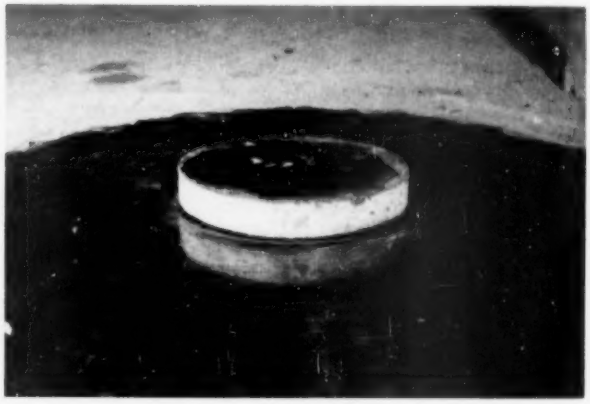

Dispersion pads and magnesium anode disks are spaced on bottom of 120,000-bbl. crude oil storage tank. The dispersion pad is built up of coal-tar enamel, ¼ in. thick. The primed and coated magnesium disk is attached in the center of the dispersion pad by means of a 1 by 6-in. standard pipe nipple quartered and spread four ways for core of anode.

New cathodic protection For crude-oil storage tanks

AT its Sour Lake, Tex., crude oil tank farm Cities Service Pipe Line Co. has installed a new method of cathodic protection to arrest internal corrosion of the bottoms of seven new crude oil storage tanks.

This is known as "Operation Lily Pad." Spaced over the bottom of each of the 120,000-bbl. floating-roof tanks are pads of quarter-inch thick coal tar enamel. These pads are 48 in. in diameter. Resting on each pad is a 15-in. circular magnesium disk weighing 26 lb.

Development of effective, economical cathodic protection is believed by Cities Service engineers to be the solution to tank bottom failures caused by salt water corrosion. Tank bottom coatings, acting as mechanical insulation, have not been entirely satisfactory for a number of reasons.

The method employed at Sour Lake, that is the use of multiple magnesium anodes resting on the insulating dispersion pads, was designed for most effective use of the available magnesium and to reduce to a minimum consumption of magnesium due to local anode action.

The anode is cast in the shape of a flat disk to permit the mass of the magnesium to be installed close to the tank bottom. This means that the magnesium will function through a minimum depth of low-resistance salt water. Use of a split 1-in. pipe nipple as the core of the anode allows for simple installation and quick replacement of new anodes. By installing the anode in the middle of the insulating dispersion pad and by reducing the surface area of the magnesium exposed to the salt water, consumption of magnesium due to local anode action is controlled. The method was developed by the Huddleston Engineering Co. of Bartlesville, Okla.

"Concrete feet" for water-flood pumpers

IN developing the shallow Peru-Squirrel, and Bartlesville sands (depths 335, 488, and 546 ft.) on its 695-acre water-flood project in Paola-Rantoul field, Franklin and Miami counties of eastern Kansas, Brundred Oil Corp. uses these "concrete feet" for its small, individual pumping units. The sturdy

By mounting small pumping units on these mass-produced concrete bases movement from one location to another is facilitated as a water-flood project is developed.

concrete bases are mass produced with foundation bolts in place. The pumping units are then bolted on and dragged from one installation location to another across the property during its developmental life.

Brundred has developed this Rantoul project on a five-spot well-spacing pattern, 330 by 330 ft. At the present time it has 234 oil wells in active operation, and 194 injection wells.

The oil-producing wells have been completed with 2-in. tubing and rag packers set and cemented at the top of the oil sand. Many of these wells were cored to aid in proper packer setting and control of the flood. Some of the first producing wells drilled were completed in two of the sands with dual strings of pipe; but those drilled later were completed with single strings of pipe, with packers and perforations opposite the sand bodies to permit production from both oil sands.

New barge employed for transfer of bulk mud to marine drilling units engaged in Gulf Coast work.

New mud barge has high delivery rate

A NEW 110-ft. barge, designed for improved transfer of bulk mud to marine units seeking oil in the Gulf Coast area, is being used by Mud Supply Co., of Lake Charles, La.

This is the first barge of its kind ever built. It will render a marine bulk-mud service in the Louisiana Gulf Coast area for all marine drilling-rig systems equipped to receive bulk mud.

Basically, barge-handling equipment is a correlation of air-activated flow and high-speed application. It is capable of delivering the mud to the rig faster than the receiving point on existing rigs can take it. Furthermore, it can lift the mud higher than required by any existing rig. This new unit can handle well over 50 tons per hour.

The new unit is completely electrified, contains its own power plant, all necessary power-driven-handling gear and is electrically interlocked for sequence operation. At the touch of a button, the unit transfers bulk mud from the bins to the receiving point on the drill rigs. The dry mud flows freely, enabling the unit to obtain a maximum capacity with minimum power consumption. Therefore the barge is not only efficient but also economical.

The barge is a 110 by 30 by 6-ft. 6-in. standard deck-cargo barge which has mounted thereon the necessary bins, housing facilities for the power unit, etc. The system lifts the mud vertically over 26 ft., which is much higher than previously accomplished. This size barge is ideal for operations on inshore canals, bayous, bays, etc., and is readily adaptable for general use in the open gulf.

The design of this rig was a three-way cooperative effort on the part of K. E. Brown, the chief project engineer of Magnet Cove Barium Corp.; Sonny Harris, vice president of Mud Supply Co., and the Shipbuilding Division of Equitable Equipment Co., Inc., which company built the barge.

Drain Line on Dual Strainer

AT many of Socony-Vacuum Oil Co., Inc., eastern pipe-line facilities dual-type strainers are employed. These are dual-chamber strainers. In normal operation the stream is passing through one chamber of the strainer. When the strainer becomes dirty due to material removed from the stream the pressure drop increases and it is then necessary to divert the stream to the second chamber and open the dirty chamber to clean it. Since this dirty chamber is bottled up under high pressure it is a dangerous procedure to remove the cover plate. Also, if the valve should leak between the two chambers, full line pressure would then be on both chambers.

It was suggested by one of the Eastern Pipe Line Division's employes that the individual chambers be interconnected with a drain line to the sump tank. This connection makes it possible to relieve chamber pressure, before opening, by draining product to sump tank. It also shows, by an excessive amount of drainage, when the valve between the strainers is leaking.

Curb Flow-Line Expansion

INJECTION gas from the compressor station may reach an injection well at pressures and at temperatures that may vary through a wide range, depending largely on the flow-line temperature and the amount of gas being compressed. These factors may result in serious expansion in the line, which in turn results in severe stressing of christmas-tre connections.

Instead of the usual "hairpin" or "omega bend" generally used to absorb expansion changes, one company uses a 360° helix or coil-type bend installed with the incoming run supported and clamped to a concrete block and with the midpoint on the bend supported by a steel plate installed at the correct angle in a block of concrete.

As the coil is simply resting on the support plate, diameter of the helix may change or the point of actual contact move up and down or across the plate. This permits the upper half of the helix bend and the straight run to the inlet valve on the christmas tree to move without any loading other than a portion of the weight of the connection.

by W. R. Crooks*

PRECOOLING ENGINE COMBUSTION AIR—2

What Combustion Air Conditioning Accomplishes

IN the first installment of this series an evaporative cooler was described. In this second and final installment engine performance is discussed briefly and a cost summary for combustion air conditioning is presented.

Fig. 1 shows the relation of fuel consumption and exhaust temperature vs. load on an engine with and without combustion air conditioning. At the full-load rating the fuel consumption has been reduced 4 per cent. The heat load on internal parts, judging from exhaust temperature, is the same at 180 b.m.e.p. when using combustion air conditioning as 128 b.m.e.p. without conditioning.

Fig. 2 gives direct comparison of the exhaust temperature and fuel consumption of three styles of operation on the same engine. Curves are presented for atmospheric, atmospheric high compression and supercharged gas engines. Note that the individual exhaust temperatures of the supercharged engines are 240° F. lower than for atmospheric gas engines, which has established their reliability and long life.

Table 1 gives a cost summary for various methods of combustion air conditioning and savings when using several types of prime movers.

Supercharging plus air conditioning has cut the size of some types of plants approximately in half. The benefits of combustion air conditioning may be summarized:

1. Permits increased engine ratings, leading to direct savings in foundation and building costs.

2. Lowers specific fuel consumption.

3. Improves combustion characteristics by more orderly flame propagation, reducing combustion noises.

4. Lowers heat load on all cylinder parts. The heat load on the cylinder assembly is the present limiting factor for continuous rating.

*Cooper-Bessemer Corp., Mount Vernon, Ohio. Portion of paper presented at N.G.A.A. regional meeting, 1953.

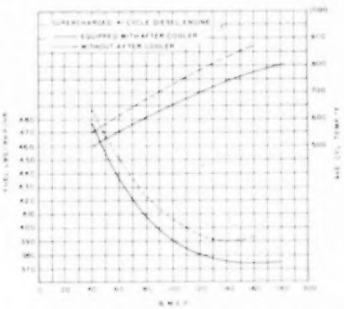

Fig. 1—Fuel consumption and exhaust temperatures vs. load with and without combustion air conditioning.

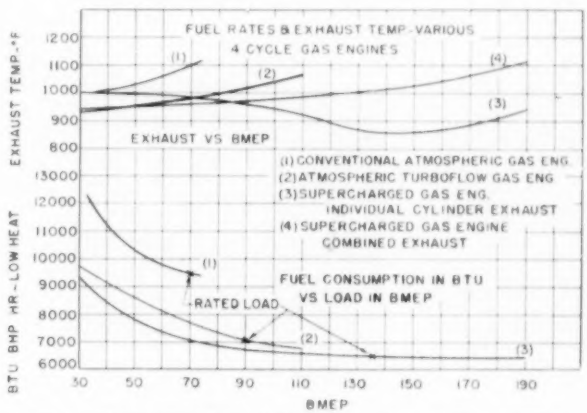
FUEL RATES & EXHAUST TEMP.-VARIOUS
4 CYCLE GAS ENGINES
EXHAUST TEMP.-°F
EXHAUST VS BMEP
(1) CONVENTIONAL ATMOSPHERIC GAS ENG.
(2) ATMOSPHERIC TURBOFLOW GAS ENG.
(3) SUPERCHARGED GAS ENG. INDIVIDUAL CYLINDER EXHAUST
(4) SUPERCHARGED GAS ENGINE COMBINED EXHAUST
BTU BHP HR - LOW HEAT
FUEL CONSUMPTION IN BTU VS LOAD IN BMEP
RATED LOAD
BMEP

Fig. 2—Direct comparison of three types of gas-engine operation.

TABLE 1—COST SUMMARY FOR CONDITIONING OF ENGINE COMBUSTION AIR

Power unit designation—	Nominal rating (hp.)	Temp., °F. Ambient	Temp., °F. Wet bulb	Method of air conditioning	Water* evaporated, gal./hp./hr.	Minimum air temp. with given conditions (°F.)	Derating required without conditioning, hp.	Cost of conditioning equipment per hp. at nominal rating	Net savings using all conditioning installed at cost of $200 per hp.
High efficiency atmospheric gas engine	2,500	105	65	(†)	.0035	90	112	$0.60	$20,900
Supercharged 4-cycle gas engine	3,700	105	65	(†)	.0230	100	710	0.81	139,000
Supercharged 4-cycle gas engine[1]	3,700	105	65	(†)	.0280	80	710	1.95	134,800
Supercharged 4-cycle gas engine	3,700	105	65	(‡)	None	100	710	1.45	130,420
Supercharged 4-cycle gas engine[1]	3,700	105	65	(‡)	None	60	710	3.30	124,000
Gas turbine	5,000	105	65	(†)	.047	80	625	1.00	120,000
Gas turbine	5,000	105	65	(§)	None	80	625	8.60	82,000
Gas turbine	5,000	100	65	(§)	None	80	500	7.85	62,800
Gas turbine[2]	5,000	100	65	(§)	None	60	4500	11.45	145,000

*Double of this amount is required if no other use is available to prevent concentration of solids in water. †Water evaporation. ‡Water radiator and refrigeration. §Separate engine driven refrigeration.

1. Special for low-grade fuel. 2. Decreased temperature permits increased rating.

Note: At present ratings in use on two-cycle engines, combustion air conditioning is not economically justifiable except where fuel gas has heavier hydrocarbons along with high ambient temperatures and low relative humidity.

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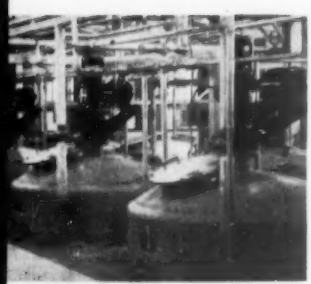

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How Do Different Methods Compare?

by R. N. Traxler* and H. E. Schweyer†

A SIMPLE method for analyzing asphalts into asphaltics, paraffinics, and cyclics was given in the preceding installment.

In order to demonstrate the validity of the method a number of analyses were made in which the acetone extraction was carried out on the original sample followed by deasphalting the acetone raffinate. The results, given in Table 1, show that for practical purposes the order of treatment with the solvents is immaterial although the initial deasphalting step with n-butanol is preferred.

The usefulness of the component analysis method is illustrated by the data in Fig. 1 for a wide variety of bituminous materials. The high asphaltic content of gilsonite is illustrated as are the high cyclic contents of materials considered to contain aromatic compounds such as a coal-tar residue and a pressure-still residuum. One furfural extract is shown to be high in cyclic content. Conversely a highly paraffinic residuum (fire stock) is shown to be low in cyclics. The position on the ternary diagram of certain other materials are presented as a matter of interest.

Different Fractionation Methods

Data are given in Table 2 to show deasphalting results obtained with a modified Marcusson method (described below), a propane deasphalting procedure proposed by Knowles and Levin[1] and the component analysis as described in Installment 2 of this series. In the propane deasphalting method the so-called asphaltenes and resins are removed as the propane insoluble material. By subtracting the 86° B. naphtha insoluble (asphaltene) from the value thus obtained the quantity of asphaltic resins is obtained. The wax is precipitated from the propane solubie oils by mixing the oil with methyl-isobutyl-ketone (hexone) at —17.8° C. (0° F.) and filtering at the low temperature. In this procedure no fractionation of the oil was made.

The differences obtained by the three methods as shown in Table 2 are to be expected, considering the different solvents and procedures employed.

Modified Marcusson Method

Place 10 gm. of asphalt in a 300-ml. Erlenmeyer flask and disperse

*The Texas Co., Port Neches, Tex.
†University of Florida, Gainesville.

TABLE 1—EFFECT OF ORDER OF TREATMENT WITH n-BUTANOL AND ACETONE

	Acetone extraction of butanol extracts, component analysis	Butanol extraction of acetone raffinate*
Residuum No. 1:		
Asphaltics, per cent	10.2	10.7
Paraffinics, per cent	68.7	65.2
R.I./70° C.	1.5090	1.5040
Cyclics, per cent	21.0	24.1
R.I./70° C.	1.5712	1.5762
Insoluble in n-pentane, per cent†	1.4	1.4
Asphaltics insoluble in n-pentane, per cent of total sample‡	1.4	(§)
Residuum No. 2:		
Asphaltics, per cent	35.4	36.3
Paraffinics, per cent	36.9	37.9
R.I./70° C.	1.5153	1.5230
Cyclics, per cent	27.2	25.7
R.I./70° C.	1.5568	1.5514
Insoluble in n-pentane, per cent†	23.5	23.5
Asphaltics insoluble in n-pentane, per cent of total sample‡	22.8	(§)

*Sample treated with acetone first (35 ml. per g.) at —23.3° C. (—10° F.); followed by n-butanol treatment of raffinate. †Commonly called asphaltenes. ‡Butanol raffinate on Buchner funnel extracted with 150-175 ml. of n-pentane. §Not determined.

TABLE 2—COMPARISON OF MARCUSSON, PROPANE, AND n-BUTANOL METHODS OF DEASPHALTING AND DERESINING

Process—	Air blown			Residuum			Vacuum reduced			Air blown		
Number	308-H			309-A			309-C			327-D		
Density, 25° C (77° F.)	0.987			1.014			1.029			1.016		
R.I./70° C. (158° F.)	1.5600			1.5730			1.5910			1.5708		
Soft. point, R. & B.:												
°C.	138.9			40.6			59.4			50.0		
°F.	282			105			139			122		
A.S.T.M. penetration, 25° C. (77° F.), 100 g., 5 sec.	18			210			41			50		
Insoluble n-pentane, per cent	37.6			24.7			29.1			20.6		
Method*—	M	P	C	M	P	C	M	P	C	M	P	C
Asphaltics,† per cent	58.5	46.0	45.6	52.9	39.8	42.6	59.8	48.6	51.3	58.2	37.5	24.8
Oils, per cent	41.5	54.0	54.4	47.1	60.2	57.4	40.2	51.4	48.7	41.8	62.5	75.2
R.I./70° C. (158° F.)‡	1.4816	1.4957	1.5087	1.5005	1.5192	1.5300	1.5041	1.5225	1.5405	1.5124	1.5310	1.5506

*M—modified Marcusson. P—propane. C—component analysis. †Considered as asphaltenes plus resins for the Marcusson and propane methods. ‡Calculated from the refractive indices of the paraffinic and cyclic fractions assuming the R.I. to be additive.

Note: Resins can be obtained by subtracting insoluble in n-pentane (asphaltenes) from asphaltics.

in n-pentane (Phillips pure grade 99 mole per cent minimum purity). Dilute with pentane to a volume of 200 ml., and allow to stand at 25° C. (77° F.) overnight. Decant and filter through a weighed 6.3-cm. Buchner funnel containing an asbestos mat. Redisperse the asphaltenes remaining in the flask with 50 ml. of pentane and transfer to the filter. Wash until washings are colorless. Dry to constant weight and weigh funnel and content.

Transfer filtrate to a 1-l. Erlenmeyer flask and adjust volume to approximately 300 ml.

One-hundred fifty grams of previously oven-dried (105° C.) 200-mesh fuller's earth from Ivy, Utah, is cooled and added to the filtrate and shaken vigorously for 2 minutes. The mixture is then shaken for 1 minute every 10 minutes for 1 hour.

The earth and absorbed asphaltic resins are removed by filtering through an 11.5-cm. Buchner funnel, using an 11-cm. No. 44 Whatman filter paper, into a 1-l. vacuum flask. Wash the filtered earth by breaking the vacuum and adding approximately 75 ml. of pentane. Vacuum is then applied until the portion that was used for washing is completely removed. This procedure is repeated at least six times; 500 ml. is used for transferring and washing the residue.

A portion of the resultant solution is placed in a weighed 400-ml. thin-wall rubber extraction flask, distilled carefully to a small volume, and the remaining solution added. This composite solution is distilled to remove the remaining pentane as completely as possible after which the flasks and contents are dried to constant weight on a steam bath or in a mechanical convection oven at 104.4° C. (220° F.). The per cent asphaltenes and per cent oils are calculated and the per cent resins are determined by difference.

The oils in the 400-ml. flask are then subjected to an acetone extraction by following the procedure for paraffinics and cyclics separation as in component analysis. The refractive indexes at 70° C. (158° F.) are then measured on the separated fractions.

Refractive Index

Refractive index is widely used in the petroleum industry as a quality and control test and appears to be an analytical tool that can be of value when applied to asphaltic materials. In general, increasing refractive index indicates increasing molecular weight, but, for materials of similar molecular-weight range, higher refractive indexes are indicative of increased "cyclicity." Thus, a refractive index determination on an asphalt may give a gross characterization of the material which can be of considerable value when interpreted in conjunction with other physical properties of the material.

Why Component R.I.'s Are Necessary

As more component analysis data are obtained, the necessity for refractive index values of the components becomes apparent. Thus, in many cases two or more asphalts may show the same component analysis, but their physical properties and refractive indexes may be different. In isolated cases two asphalts can show the same component analysis and refractive indexes of the fractions without being identical. This is not unreasonable since the various mixtures of different compounds, which can be present in the fractions from different stocks, might show similar refractive index values without being identical. Component analysis can be used to prove that two materials are **not identical,** but on a positive basis, it is limited to showing that two or more materials **are likely** to be the same but not necessarily so.

Fig. 1—A wide variety of bituminous materials have been analyzed by n-butanol-acetone solvent extraction into asphaltics, paraffinics, and cyclics.

Measuring Refractive Index

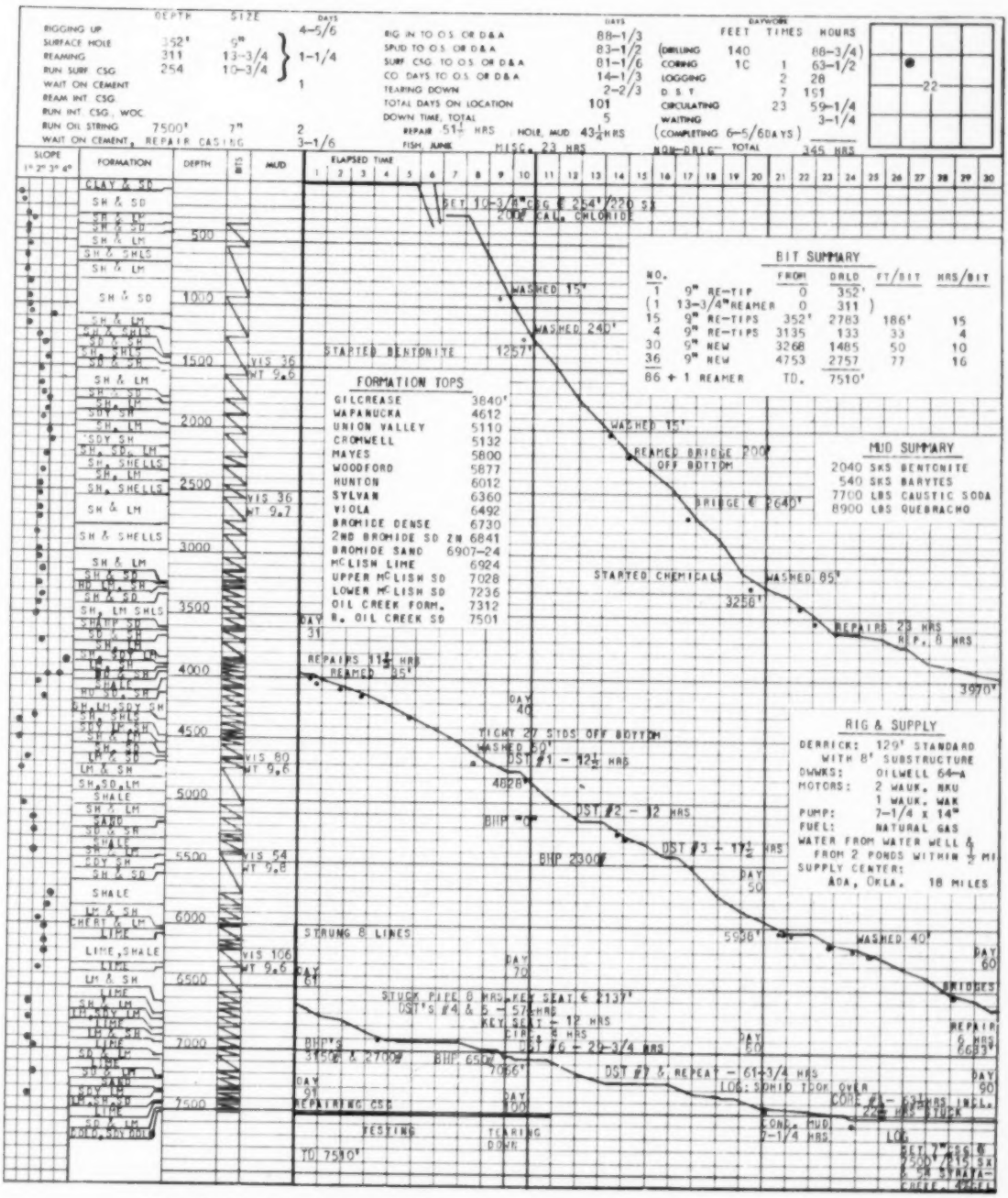
The actual measurement of refractive index on asphaltic materials involves two problems. The first is the use of elevated temperatures to insure sufficient fluidity and complete miscibility of all components present. In most cases this can be attained by running determinations at 70° C. (158° F.) at which temperature an Abbe' type refractometer is suitable. The second problem involves adoption of a technique to determine the readings on samples that are too dark to be measured when using reflected light. This problem can be solved by utilizing the fact, as shown later, that the refractive indexes of a series of mixtures made of an asphalt and a petroleum oil are directly proportional to the composition expressed as per cent by volume.

Reference

1. Knowles, E. C. and Levin, H. Ind. Eng. Chem., Anal. Ed. 13, 314 (1941).

McAlester Basin Drill Log

Contractor: Fleet Drilling Co.
Operator: Sohio Petroleum Co. and Beach & Talbot.
Well: 1 W. N. Guth.
Location: Section 22-2n-8e, Coal County, Oklahoma.



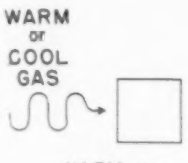
(Compiled for The Oil and Gas Journal by Drilling Data Service, Oklahoma City)

Part 44 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a RECTANGULAR TUBE and a GAS



Gas Movement: Turbulent

Direction of Movement: Normal to Tube

Heat Movement: Heating or Cooling

EQUATION:

$$h_f = 0.0921 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.675}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of gas, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of gas, ft./hr.

ρ - Density of gas, lb./cu.ft.

μ - Absolute viscosity of gas, lb./ft. hr.

LIMITATIONS:

Applicable to air or to diatomic or other gases obeying the gas laws for perfect gases.

Reynolds number ($DV\rho/\mu$) between 5,000 and 100,000.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

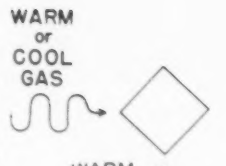
for ρ -- 130-148, 175-195, 1563.
μ -- 370-374, 1198, 1696.
K -- 459-461, 1303, 1697.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, E. R. G. Eckert, p. 144.

S 1,4 c (1) (a)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a RECTANGULAR TUBE and a GAS



Gas Movement: Turbulent

Direction of Movement: Normal to Tube

Heat Movement: Heating or Cooling

EQUATION:

$$h_f = 0.222 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.588}$$

TERMINOLOGY:

h_f - Film coefficient of heat tranafer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of gas, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of gas, ft./hr.

ρ - Density of gas, lb./cu. ft.

μ - Absolute viscosity of gas, lb./ft. hr.

LIMITATIONS:

Reynolds number ($DV\rho/\mu$) must be between 5,000 and 100,000.

Applicable to air or to diatomic gases, or gases obeying the gas laws for perfect gases.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

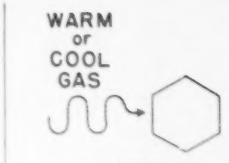
for ρ -- 130-148, 175-195, 1563.
μ -- 370-374, 1198, 1696.
K -- 459-461, 1303, 1697.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, E. R. G. Eckert, p. 144.

S 1,4 c (1) (b)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a HEXAGONAL TUBE and a GAS



Gas Movement: Turbulent

Direction of Movement: Normal to tube

Heat Movement: Heating or Cooling

EQUATION:

$$h_f = 0.0347 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.782}$$

TERMINOLOGY:

h_f - Film coefficient of heat tranafer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of gas, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of gas, ft./hr.

ρ - Density of gas, lb./cu. ft.

μ - Absolute viscosity of gas, lb./ft. hr.

LIMITATIONS:

Equation suitable for air, or for diatomic or other gases which obey the perfect gas laws.

Applicable to flow rates giving Reynolds numbers ($DV\rho/\mu$) between 19,500 and 100,000.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ -- 130-148, 175-195, 1563.
μ -- 370-374, 1198, 1696.
K -- 459-461, 1303, 1697.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, E. R. G. Eckert, p. 144.

S 1,4 c (2) (a

Controlling Corrosion*

FLOW of current onto a pipe from a dissimilar metal anode will suppress the natural anode areas along the pipe, thus keeping them from developing pit holes. Preliminary discussion of these anodes was begun in the last installment. Methods of connecting anodes to the pipe are considered here.

Anode combinations . . . There are many possible combinations for connecting anodes to the pipe line. The size of anode, the number, their distance apart, the distance from the pipe line, and the like, are all functions of the use to be made of the anode. A number of anodes spaced from 5 to 50 ft. apart along the right-of-way may be attached to a single wire running parallel to the pipe line. This wire in turn will be connected to the pipe line at about 500-ft. intervals. In other cases individual anodes are directly connected by wire to the pipe line and these anodes will be whatever distance apart is required to insure that some current, small amount though it may be, is flowing onto every square foot of the pipe line it is proposed to protect.

Figs. 24* and 25 show installations of these combinations.

When the ribbon-type magnesium anode is used, it is plowed under the surface of the ground and runs parallel to the pipe line. The pipe and ribbon are connected by insulated wire at intervals along the length of the installation. This continuous ribbon-type anode is plowed in by using a conventional cable-laying plow (Fig. 25).

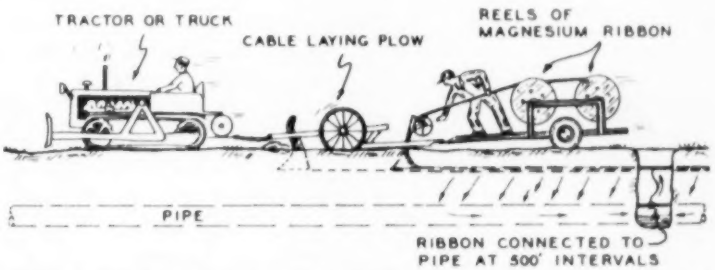
The number of locations at which it is possible to use this continuous ribbon is limited by the fact that ⅜ by ¾-in. ribbon weighing about a quarter of a pound per foot does not provide a very large mass of magnesium at any one place along the pipe line. Therefore, it can not be used where relatively large amounts of current will flow onto the line. For the most part, installations of ribbon may be used in soils having a relatively high resistance to the flow of electricity, for ordinary installations on small-diameter pipe, or where it is only desired to protect the line for a short period, say 5 to 10 years.

Most installations of magnesium are designed so that the magnesium anodes will provide a small amount of current flowing onto each square foot of the pipe line and still have sufficient mass of magnesium to last at least 25 years.

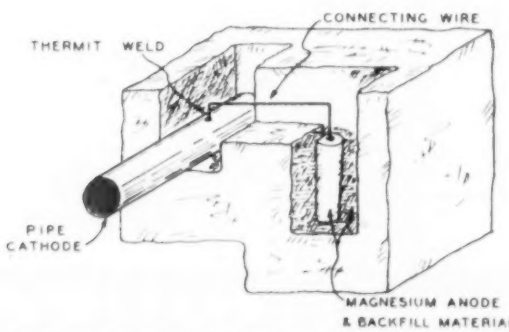
The magnesium anode will corrode to provide this protection, and enough must be installed so that the amount of magnesium present is sufficient to provide metal to corrode for the period over which it is proposed to protect the pipe line.

The type of anode installation to be made is a matter of choice to the corrosion engineer. The installation he selects will depend upon a number of factors such as the size of the pipe line, the number and activity of the galvanic cells existing along the pipe line, whether or not the soil offers very much resistance to the flow of electricity, and of course, how many years of life it is desired to add to the unprotected normal life of the line.

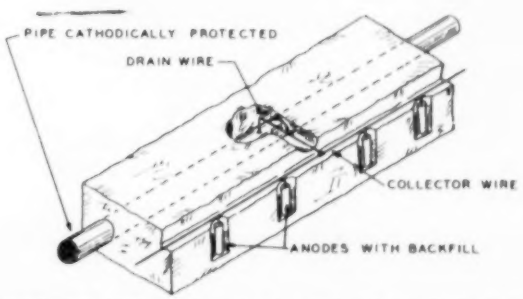
*Taken from a Manual on Underground Corrosion, Columbia Gas System Service Corp. Figure numbers used in the series are progressive.



MAGNESIUM-RIBBON installation for cathodic protection of pipe lines (Fig. 26).



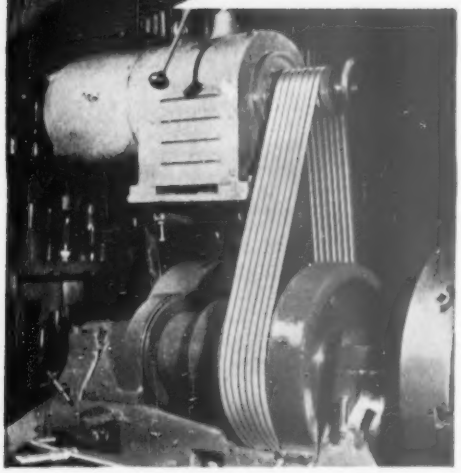
SINGLE-ANODE INSTALLATION showing setup for cathodic protection of buried pipe (Fig. 24).



MULTIPLE ANODES in series installation for cathodic protection of buried pipe (Fig. 25).

Why Gates V-Belts Wear Longer!

The CONCAVE SIDE
(U.S. Pat. No. 1813698)
tells the story...



Typical Gates Vulco Rope Drive — the Gates V-Belts are built with Concave Sides to insure longer belt wear.

Take any *straight-sided* V-Belt (Fig. 1). Bend it — as if it were going around a pulley. The sides will at once *bulge out* (Fig. 1-A) — and this causes *extra wear* where the bulge is greatest. (See arrows).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* to *fit exactly* in the sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley so that the *full side* takes the wear — and this means longer belt life and *lower* belt *costs* for you!

When you buy V-Belts, always get the V-Belt with the CONCAVE SIDES — the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

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QUESTIONS ON TECHNOLOGY

Relative Prices of Various Grades of Natural Gasoline

by W. L. Nelson
Technical Editor

"In your issue of July 13, 1953, you discussed the conversion of volumes of natural gasolines into an equivalent volume of Grade 26-70. Can you also suggest how to price natural gasolines?"—W. S. T.

In 1931 when the present system of grading natural gasoline according to vapor pressure and percentage evaporated at 140° F. was adopted, butanes as such had little or no value. Accordingly, the purchaser was only interested in the butane-free base material contained in the natural gasoline except, of course, for his limited need for butane to raise the vapor pressure of his finished gasoline. Accordingly, the factors shown in Table 1 labeled "Butane Valueless" were suggested in the Proceedings of the Natural Gasoline Association of America as a means of estimating the prices of the various grades of gasoline relative to the price of Grade 26-70. These factors consist simply of the ratios of butane-free base stock in the various gasolines as discussed on this page (p. 149, July 13, 1953), "Volume Equivalent of Various Grades of Natural Gasoline."

TABLE 1—FACTORS FOR ESTIMATING THE PRICE OF VARIOUS GRADES OF NATURAL GASOLINE

	Butane valueless	Present practice
12 R.v.p. and lower	1.471	
14 R.v.p. gasoline	1.361	1.3-1.36
18 R.v.p. gasoline	1.258	1.2
22 R.v.p. gasoline	1.129	1.1
26 R.v.p. gasoline	1.000	1.0
30 R.v.p. and above	0.896	

The "Butane Valueless" factors of 1931 are no longer used (see "present" factors of Table 1). Shortly after 1931, a large surplus of natural gasoline appeared during the development of Oklahoma City field. The gasoline composition was 22-70 and due to the large surplus, a price only 10 per cent higher than the price of 26-70 Grade was accepted rather than the 12.9 per cent of the earlier factors. This reduction in price has persisted until today (see Table 1). The factors used today may also reflect to some extent the value of butane. If the price of butane were the same as the price of butane-free base stock (12 lb. R.v.p. and lower), a single price could be charged for all grades of natural gasoline.

At the other extreme, if butane is valueless the 1931 factors for volume or price corrections would be valid (see Table 1 for "Butane Valueless"). The factors used at present indicate a value of butane ranging up to about 1 cent per gallon or about one-eighth of the price of butane-free base stock. This only means that most gasoline plants are not situated near chemical plants that can utilize butane and therefore cannot actually market butane at the posted price of 5 cents per gallon (late 1952) that is received by a few operators.

The price of natural gasoline is usually lower than the price of regular unleaded refinery gasoline. Accordingly, the refiner makes a small profit by the handling of natural gasoline and he would therefore like to handle as much as possible without exceeding vapor-pressure specifications for his total plant gasoline. The refiner prefers low-vapor-pressure gasoline because he can utilize much more of it—about 3.5 times as much 14-40 Grade as 26-70 Grade.

Table 2 indicates the general relationship between the prices of gasolines, butane, and propane. Natural gasoline appears to sell for 1 to 4 cents under the price of regular-grade motor fuel and the liquefied gases and butane another 1 to 2 cents off.

TABLE 2—ILLUSTRATION OF PRICES OF NATURAL GASOLINE AND L.P.G.
(Cents per gallon)

	Group 3—Mid-Continent				Natural‡ gasoline, U. S. avg.	Propane†	
	Regular motor gasoline*	Natural gasoline 26-70*	Butane†	Propane†		Houston	New York
1951					7.9		
1920					18.7		
1925					10.7		
1930					5.8		
1935					4.3		
1940	4.37	2.0			2.9		
1941	5.37	3.5			3.9		
1942	5.75	3.25			3.8		
1943	5.87	4.12			4.4		
1944	5.94	4.75			4.9		
1945	5.87	4.62			4.4		
1946	6.12	3.87			4.2		
1947	8.25	6.00			6.2		8.58
1948	10.37	8.5			8.6		8.99
1949	9.62	5.87			6.4		6.63
1950		6.12					6.34
1951		6.25					7.07
Late 1952		6.87	5.0	4.0		3.75	7.71
Early 1953			4.25	3.6		3.75	8.0

*The Oil and Gas Journal. †National Petroleum News. ‡U. S. Bureau of Mines.

Ring Number of Kerosine

"What is the ring number of kerosines?" W.L.S.

Ring number is a general measure of the tendencies of a kerosine to smoke when it is burned in a lamp. It is based on the thermo viscosity and A.P.I. gravity as follows:

$$\text{Ring No.} = \frac{\text{Thermo Vis.}}{5} - 10\,(46^\circ - \text{A.P.I.})$$

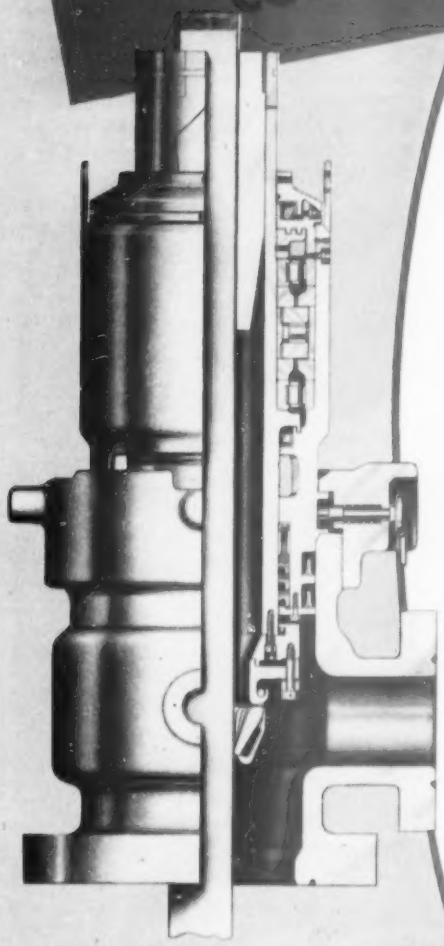
The relationship between the now little used thermo viscosity and kinematic viscosity was discussed in the November 24, 1952, issue of this page (page 138).

The Shaffer Combination Rotating Blowout Preventer and Stripper

Engineered FOR BETTER PRESSURE CONTROL

is the most advanced equipment yet perfected for automatic pressure control because it embodies *so many* unique advantages in *one* unit.

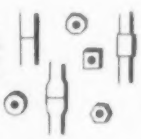
Moreover, its operating simplicity is unequaled. There's nothing to remember—or forget—when pressure emergencies threaten because this unit *automatically* seals off around the drill string as soon as the tools are lowered into the well... *and maintains this pressure-tight seal—without attention—throughout all subsequent drilling operations, including the adding or removing of drill pipe.*



Two types Type 30 for drilling through 10¾" casing and larger — Type 51 for slim hole drilling, drilling-in, production jobs and remedial work. Both have same basic design features.

1 Space-Saving Compactness that permits installation under difficult space limitations. Even flow line connections are provided in the body—no spools or similar equipment are needed!

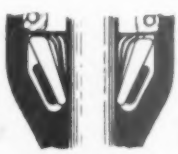
2 Full Opening Bore is provided for passing bits, reamers and other abnormally large tools by simply rotating the bonnet 1/6 turn. This locks—or unlocks—the internal mechanism so that equipment that will pass through the casing will also pass through the unit.



3 Any Shape Kelly — whether square, hexagon or octagon—is sealed off continuously while in the unit. Also, the varying diameters of the drill string—drill collars, subs, couplings, tool joints and drill pipe (whether flush joint, upset or coupled) all readily pass through the unit without losing the pressure-tight seal—because the Stripper Rubber **automatically** expands and contracts to pass them.

4 Continuous Pressure Protection is assured by the flexible Stripper Rubber which fits tightly around the drill string. No manual adjustments—no outside mechanical or hydraulic pressure—are necessary to maintain the seal while drilling, or while going into or coming out of the well.

5 The Stripper Rubber Rotates with the kelly—not one inside the other. Therefore, wear on the Stripper Rubber is negligible and a pressure-tight seal is maintained. In addition, all rotating loads are carried on separate thrust and radial bearings to withstand a combination of horizontal or vertical loads. Bearings are pre-packed with heat-resisting lubricant!



6 When Pulling Pipe out of the well, the Stripper Rubber continues to maintain its pressure-tight seal around the drill string while a patented barrier of steel latches prevents damage to the Stripper Rubber as couplings, tool joints and other variable diameters are pulled through it. This steel barrier also prevents the rubber from extruding under high well pressures.

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30 years OF OIL TOOL LEADERSHIP

Contact your nearest Shaffer representative for complete details — or write direct.

Send for your free copy of the 1953 Shaffer Catalog.

See pages 4611 to 4686 of your 1953 Composite Catalog.

EQUIPMENT MEN . . . in the News

Appointments Announced By Republic Supply Co.

A. L. AUGUST

Republic Supply Co. has announced the appointment of Alex L. August as district manager of the Shreveport district, succeeding W. M. Haynes, who has resigned. C. J. Jump has been named district manager of the Rocky Mountain area, and will locate his office in Denver.

August joined Republic Supply at Corpus Christi, Tex., in 1949, having previously been associated with oilfield equipment companies both in the United States and South America. He was previously affiliated for 10 years with another supply company, and also served for 4 years as purchasing agent with a major oil company in Venezuela.

C. J. JUMP

M. GILMORE

E. CARPENTER

BENNY BARTON

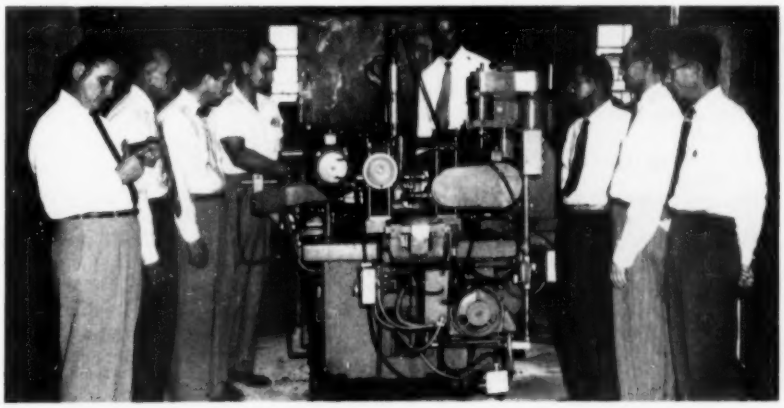
Jump began service with Republic Supply in 1945 and prior to his advancement to district manager was assigned to stores in Artesia, N. M., Big Spring, Kermit, and Odessa, Tex. In addition to his duties as district manager of the new area, Jump will be in charge of city sales.

The company has also announced the opening of new stores at Farmington, N. M.; Arkansas City, Kans., and Whitesboro, Tex.

Morris Gilmore, formerly store manager at Olney, Tex., has been assigned to the Farmington store as manager. Gilmore joined the company in 1947.

Earl Carpenter has been named manager of the Arkansas City store, which will serve the area of southeastern Kansas and northeastern Oklahoma. Carpenter first joined Republic Supply at McLeansboro, Ill., and later served the company at Cement, Okla.

Benny Barton has been named store manager at Whitesboro. This new store will serve the Grayson-Cooke-Denton county areas. Barton joined Republic Supply in 1950, and has been with the company's stores in Borger, Pampa, Electra, San Angelo, and Abilene, Tex.



Socony-Vacuum Representatives Tour Mission Plant

A group of employes from the Venezuelan offices of Socony-Vacuum inspected this machine for making valve stems while on a tour of the Houston plant of Mission Manufacturing Co. recently. The machine, which makes stems for Mission Silver Top and Super Service valves automatically, was designed and built at Mission. Shown, left to right, are: Villa Mizar, who is looking at a finished valve stem; Ignacio Romero; R. N. Ross, of Magnolia Petroleum Co., Houston; Arvo Ceepo, of Mission, who designed the machine; Ted Fullinwider, of Mission; Narciso Rangel, Rafal Fraile, and George Kendall. The group from Socony-Vacuum is making a tour of important industries in the United States.

Wittich Appointed Export Agent for Lorum Fibre Co.

Lorum Fibre Co., Inc., New York, has appointed the Val R. Wittich Organization as representative for "leather fibre," a drilling fluid additive for combating lost circulation. A comparatively recent development, over 2,000,000 lb. was sold in the United States in 1952.

Fred J. Jobst, sales engineer, and Clay H. Hesse, sales assistant, will handle the account in cooperation with Wittich.

Dorflinger Is Promoted To District Manager

G. DORFLINGER

Fischer & Porter Co., Dallas, has promoted Glen Dorflinger to a district manager for the sale of its process-control instruments in Houston.

The company's Houston district office has been enlarged with the addition of Harry Ogden and James B. Cochran to its sales and service group.

Avondale Announces New Porcelain Enamel Plant

Avondale Marine Ways, Inc., has under construction a large-capacity plant and facilities for the manufacture of porcelain-enamel architectural products. These will include load-bearing walls, loadspan roof decks, and other products which are new to the building industry. The plant is being constructed adjacent to the main operation of Avondale Corp., at Avondale, La.

The new plant will operate as a division of Avondale Marine Ways, Inc.,

and will be one of the most modern of its kind in the world. The facilities will include sheet metal fabrication, pickling for treatment of the steel prior to enameling, automatic spray machines for applying the material, a large continuous furnace for fusing the enamel to the steel, and ball mills in which the enamel will be prepared.

The new division will be under the management of Ben F. Birdwell, and the technical and production operations will be under the direction of Paul Kates.

Refinery Supply Co. Elects Current Officers

At the annual meeting of the board of directors of The Refinery Supply Co., held in Chicago in August, the following officers were elected to service during the current fiscal year: W. A. Schlueter, chairman; J. T. Gossett, president; Leo T. Norville, secretary; W. J. Luby, treasurer; J. B. Okeson, vice president; T. C. Williams, vice president; Louis L. Dent, assistant secretary; L. Masbruch, assistant treasurer and assistant secretary; R. K. DiVall, assistant secretary, and Roger S. Randolph, assistant secretary.

U. S. Steel Names Phair Assistant Sales Manager

Milton W. Phair has been appointed assistant manager of sales at the Houston district sales office of the United States Steel Corp.'s Tennessee Coal & Iron division, it was announced recently by G. J. Stewart, assistant general manager of sales, Western area, for T.C.I.

Phair, who has been with United States Steel for 26 years, has worked in the Houston district office since 1933, when he was transferred to T.C.I. from the Carnegie-Illinois Steel Corp. He began as a stenographer and advanced through the positions of clerk, correspondent, and senior correspondent, becoming a salesman in 1947, from which position he advanced to the assistant managership.

Mid-Continent Supply Named by Gray Tool Co.

Gray Tool Co., of Houston, has announced the appointment of Mid-Continent Supply Co. as exclusive distributors for Gray swivels and swivel parts in Canada. The company further announced that the Mid-Continent Supply Co. is now a fully authorized distributor in the United States for Gray swivels, and will maintain complete stocks of swivel parts.

Lundy Made Assistant Sales Manager by Peerless Pump

E. W. LUNDY

Announcement is made of the appointment of Everett W. Lundy to assistant sales manager, Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles, by B. A. Tucker, general sales manager. Lundy, previously Pacific district manager for the pump firm, will be succeeded by Robert H. Hull, presently Peerless' central district

R. H. HULL

W. T. HARMAN

manager at Indianapolis. Hull, in turn, will be succeeded by Waldo T. Harman, Chicago branch office manager.

Lundy became associated with Peerless Pump organization in 1940, and was successively promoted from sales engineer to branch office manager at Phoenix to Pacific district sales manager.

Guiberson Holds General Sales Meeting at Dallas

Executives and sales representatives in attendance at the general sales meeting of the Guiberson Corp., Dallas, were, first row: J. P. Killingsworth, C. B. Alexander, M. W. Breedlove, H. S. Zane, Jr., A. P. Smith, W. R. Guiberson, G. G. Guiberson, L. E. Vessels, R. Z. Mendenhall, and Pat Sullivan. Second row: W. D. Watson, C. A. Teel, S. D. Beckley, E. C. Trott, E. E. Embury, O. A. Hess, C. L. Forcum, D. B. Carver, W. V. Phillips, D. L. Fry, P. L. Brown, and R. L. Lindsay. Third row: R. J. Foreman, L. T. Ferguson, W. R. Forcum, C. E. Lance, F. H. Bronaugh, Frank Bridwell, P. P. Kizis, D. E. Ritchie, J. T. Anderson, H. M. Cherry, and R. A. Day. Fourth row: B. M. Matthews, W. F. Meier, A. E. Brummett, R. L. McAdams, C. E. Winders, J. R. McManus, H. H. Louden, A. M. Alexander, L. E. Brookover, R. W. Lindsay, Jr., and D. L. McGill.

Guiberson Corp. held a general sales meeting in late August at the plant in Dallas with more than 45 sales representatives and executives of the corporation attending.

Keynote of the meeting was made by Gordon G. Guiberson, president, who reported on the company's sales progress for the first part of the year.

Alex P. Smith, executive vice president and general manager, opened the meeting with a summary description about the new machine tools recently added and the completion of new buildings and facilities at the manufacturing plant in Dallas.

Pointing to the very satisfactory increase in sales for anchors, packers, safety joints, and special rubber products, Harry S. Zane, Jr., general sales manager, conducted the 2-day meeting and led the discussions on improvement of present equipment and development of new equipment.

Denver Sample Log Co. Opens Montana Office

Joe E. Guyer, president, Denver Sample Log Co., has reported an expansion of the company's facilities to provide for the development and distribution of sample logs of important wildcats being drilled in Montana and North and South Dakota.

A new office has been opened in Billings, Mont., under the direction of Dale Wallington, former manager of the company's Canadian branch in Regina, Sask. Wallington will be assisted in stratigraphy by J. W. Skrabanek, who was previously employed by a consulting firm in Midland, Tex.

Services of the new Montana office will include distribution of a new type colored stratigraphic - radioactive log recently designed by Denver Sample Log Co.

Pipe Line Contract Awarded A. O. Smith Corp. of Texas

One of the nation's leading producers of large-diameter welded seam line pipe, A. O. Smith Corp. of Texas, celebrated its third anniversary in August by landing the largest order for 30-in. pipe in its history. This contract calls for the production of some 313,896 tons of 40-ft. lengths of pipe which will form the main segment of the 1,200-mile natural-gas line from the Louisiana Gulf fields to Michigan and Wisconsin.

The customer is American Natural Gas Co., whose operating subsidiary, American Louisiana Pipeline Co., will undertake the construction of the line. The Houston mill expects to begin producing pipe under the contract in 1954.

The record size of this order is graphically demonstrated by the fact that in its first 3 years A. O. Smith Corp. of Texas has produced tonnages only two and one-half times the amount of this single contract.

A breakdown of the 3-year production at the big A. O. Smith plant shows 1,964 miles of 30-in. pipe was made; 171 miles of 26-in.; 529 miles of 24-in.; 283 miles of 20-in., and 188 miles of 16-in.

Bucyrus-Erie Names Stone To Managerial Sales Post

The appointment of Selden A. Stone as assistant drill sales manager has been

S. A. STONE

R. C. HARLAN

announced by Bucyrus-Erie Co., South Milwaukee, Wis., manufacurer of spudders for drilling and servicing. Stone was formerly drill sales representative working out of Evansville, Ind. The company has also announced the appointment of Richard C. (Dick) Harlan as spudder sales representative, who will retain headquarters at Akron, Ohio.

Stone will assist drill sales manager, L. B. Birckhead, in the direction of spudder sales throughout United States and Canada. A graduate of Marietta College, Stone started in the oil-field-equipment business with Parkersburg Rig & Reel Co. in 1934, later working with Continental Supply Co. He spent

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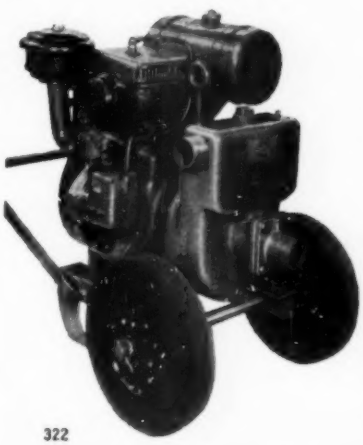
Only Marlow Self-Priming Centrifugal Pumps Give You *All 12* Superior Features for *Better Pumping Performance!*

AIR-COOLED ENGINE-DRIVEN SELF-PRIMING CENTRIFUGAL PUMPS

FEATURES	MARLOW	PUMP "A"	PUMP "B"	PUMP "C"	PUMP "D"	PUMP "E"
1. Non-Recirculatory Positive Priming	YES	YES	NO	YES	NO	NO
2. Self-Cleaning	YES	YES	NO	YES	NO	NO
3. Low Suction Inlet	YES	NO	NO	NO	YES	NO
4. Horizontal Discharge	YES	NO	YES	YES	YES	YES
5. Metal - to - Metal Grease - Lube Seal	YES	YES	YES	YES	YES	YES
6. Vacuum Gauge Plug	YES	NO	NO	NO	YES	YES
7. Discharge Gauge Plug	YES	NO	NO	NO	YES	NO
8. Supplied Complete with Male Fittings	YES	NO	NO	NO	NO	NO
9. Impeller Keyed to Shaft	YES	NO	NO	NO	NO	NO
10. Only One Gasket	YES	YES	NO	YES	NO	NO
11. Replaceable Wearing Parts	YES	YES	YES	YES	YES	NO
12. Convertible Base and Chassis	YES	NO	YES	YES	NO	NO



322

Yes! Marlow, and Marlow *alone*, gives you *all* the features in dependable engine-driven, self-priming centrifugal pumps that bring you high efficiencies and low operating and maintenance costs. That's why contractors are buying *more Marlows than any other pumps!*

For complete information on how Marlow can help give you more pump performance – at less cost – see your Marlow dealer or write for Bulletin C-52.

MARLOW PUMPS
Other factories in France and England

RIDGEWOOD, NEW JERSEY
Branch Plants: DeQueen, Arkansas; West Chicago, Illinois
Distributors and Dealers everywhere

finest in the Field!

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COURTESY • SERVICE • DEPENDABILITY

PUMPING UNITS

AVAILABLE IN A RANGE OF SIZES
from 61,500 Peak Torque through
177,000 Peak Torque . . . . . .

These design features assure years of trouble-free operation . . . . . .

GEAR BOX continuous tooth herringbone gears — proven quality roller bearing thru-out — maintains exact centers trough type lubrication — positive — no stop-ups. Oil reservoir for each bearing — no dry starts — large shafts — minimum deflection.

COUNTER BALANCE:

SMALL UNITS — combination adjustable beam and optional fixed crank weights.

LARGE UNITS — crank balanced — optional economical filler weight type or adjustable type with unique ratchet adjustment feature.

STRUCTURAL COMPONENTS:

SAMPSON POST — four legged braced for rigidity.

BASE — optional elevated gear box for floor clearing cranks.

WALKING BEAM — heavy CB beams — adjustable for alignment — loaded for max. strength.

PITMAN & EQUALIZER — pinned connections for true equalizing action.

HORSEHEAD — rocker connection with beam for alignment. Easily unlatched from beam and polished rod for well servicing clearance.

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TULSA, OKLAHOMA

Stores in: KANSAS, OKLAHOMA, TEXAS, LOUISIANA, AND NEW MEXICO

COURTESY • SERVICE • DEPENDABILITY

about 2 years with Franklin Supply Co. as store manager and field salesman, a year with International Derrick & Equipment Co., and more than 11 years with Bucyrus-Erie drill sales organization.

Harlan brings to the company more than 25 years of oil-field experience. In 1930 Harlan joined the Star Drilling Machine Co., Akron, in the service and installation department, later becoming manager of domestic sales. His territory with Bucyrus-Erie will include Ohio and parts of Indiana, Illinois, Michigan, and Ontario, Canada.

Cameron Named to Executive Position with Marley Co.

J. A. Cameron has been appointed executive vice president and assistant general manager of The Marley Co., major manufacturer of water-cooling towers and other cooling equipment for industry and air conditioning. Cameron has been with Marley Co. since 1937, at which time he served as a sales engineer in their New York office. In 1939 he was promoted to New York sales manager, and within a short time was elevated to eastern regional manager, in which position he has served until his recent appointment. In 1944 he was made vice president of the company, and in 1952 he was elected to the board of directors.

Prior to joining The Marley Co., Cameron was a sales representative with Ingersoll-Rand Co. in New York.

St. Hilaire Is Named General Sales Manager

Frank D. St. Hilaire has been appointed general sales manager of Graver Construction Co., a division of Graver Tank & Manufacturing Co., Inc., with headquarters in New York City. He will be in charge of all domestic and foreign engineering and construction sales directed primarily at the petroleum, chemical, and steel industries.

Formerly Graver's chief engineer on the Tapline project in Saudi Arabia and foreign representative for The Tex-

WECO...the UNIONS you can trust for Sealing and Service

Selected Raw Materials

Advanced Manufacturing Practices

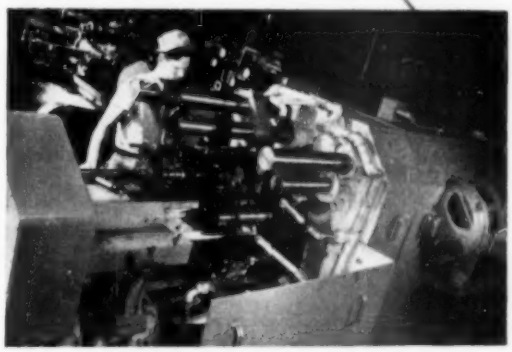
Ball and Cone Seat

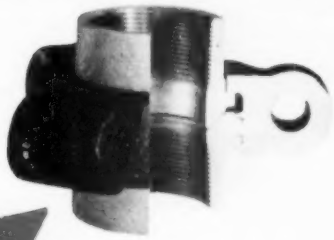
Rugged Acme Threads

Heavier Wall Sections

Precision Seating Surfaces

• One of several Six-Spindle automatic machines specially tooled for the manufacture of WECO Unions.





WECO FIG. 100 UNION

Advanced Manufacturing Practices

• At WECO, the manufacture of wing unions for the oil industry has become a highly specialized and precision process.

To maintain the long-lasting high standard of service . . . the unvarying uniformity and unmatched quality of WECO Unions has required specially built machines and specialized practices which are exclusive with WECO.

The use of automatic machines, many of which have been specially designed or modified for our operations, assures high-speed, high-quality production of WECO Unions. WECO, the most complete line of wing unions in the world, assures the utmost in dependability for sealing and service wherever a wing union is required.

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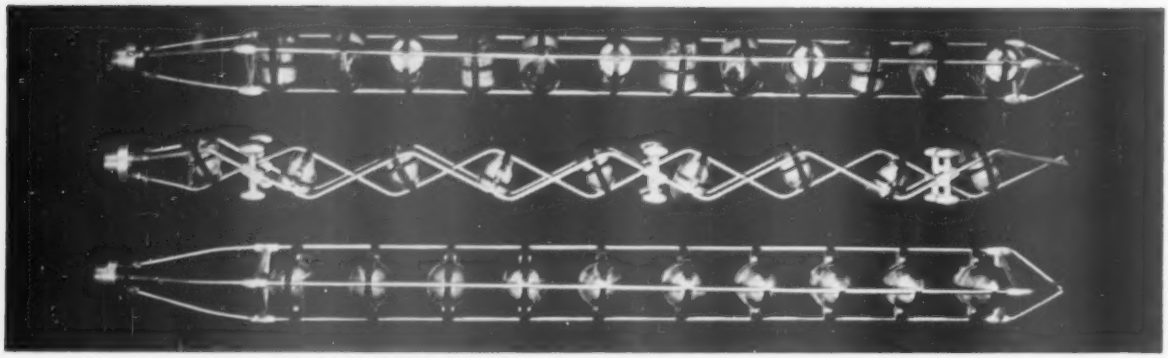
CHIKSAN EXPORT COMPANY, Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

DOWELL GLASS GUN—



Shown above are three types of Dowell Glass Guns: horizontal-firing (top); angle-jet (center); mono-directional (bottom).

DOWELL Perfojet can be combined with these other Electric Pilot services

SELECTIVE ACIDIZING—Pilot is used to direct acid into selected zones to get best treatment results. As many as *three separate* zones can be acidized selectively in *one operation*.

PERMEABILITY SURVEYS—Pilot is used to show location of permeable zones and their capacity to take fluid in relation to other zones, especially as a guide to selective acidizing. Also used to locate leaks around casing shoes, leaks around cement plugs and holes in casing.

SPINNER SURVEYS—Pilot is used to measure relative production or injection capacity of zones exposed in all types of producing or input wells.

WATER LOCATION—Pilot is used to locate points of water entry into wells, contributing to successful completion and workover programs. The latest water location method uses a photoelectric cell and opaque dye.

CALIPER SURVEYS—Pilot is used to give information on well bore diameters and irregularities. The caliper automatically records diameters as large as three feet and shows variations as small as casing collars—a fractional part of an inch!

THE ELECTRIC PILOT is also used for Radio-active Surveys, Temperature Surveys, Hot Wire Lost Circulation Surveys, wire-line bridge plugs and production packers.

BEST IN JET PERFORATING!

Deeper penetration—large hole size—wide choice of "shooting" patterns with the DOWELL expendable Glass Gun

The expendable Glass Gun, developed by Dowell, uses the shaped charge to provide more effective well perforating than ever before. The large amounts of explosive used and the design of the charges, give deeper penetration and bigger hole size.

The Glass Gun consists of shaped charges held in a carrier made of ⅝ inch aluminum tubing. Each charge is sealed in two fluid-tight glass hemispheres and positioned in the carrier according to the desired "shooting" pattern. Glass Gun charges have withstood 10,000 psi pressure without collapsing or leaking.

These charges are detonated by Primacord, an explosive cord contained in the aluminum tubes. When the charges are fired, high velocity jets of gas are formed. These jets can penetrate more than seven inches into mild steel. At the same time, the glass containers and the carrier are disintegrated by the explosion, leaving a junk-free hole.

Dowell Glass Guns can be assembled to fit almost any well, with carrier sizes ranging from as small as 3⅜ inches up to 3 feet or more in diameter.

Among the Glass Guns offered by Dowell are the following types designed to meet various formation characteristics: the *horizontal-firing* gun for deep, level penetration . . . the *angle-jet* gun that shoots upward at an angle of 30° from the horizontal to penetrate shale streaks . . . the *mono-directional* gun which fires all its charges in the same direction for vertical-plane fracturing.

For effective jet perforating, you can rely on Dowell Perfojet with the Glass Gun. For complete information on this development, call your nearest Dowell office, or write directly to Tulsa, Dept. I-11.

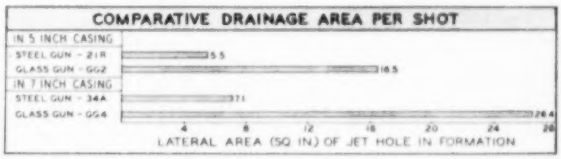
DOWELL

PERFOJET PERFORMANCE DATA

COMPARATIVE PENETRATION IN CASING PERFORATING

CASING SIZE	GUN SIZE	TYPE CHARGE	APPR. PERF DIAMETER	INCHES PENETRATION IN FORMATION
●USING STEEL GUN IN CASING				
5"	3⅜"	10R	½"	6.6
5"	3⅜"	21R	½"	8.1
5½"	4"	21R	½"	7.7
7"	5"	34A	½"	7.5
5 IN 7"	3⅜"	21R	½"	5.7
●USING GLASS GUN IN CASING				
5½"	4⅝"	GG2	½"	14
7"	4⅝"	GG4	½"	15
5 IN 7"	3⅜"	GG2	½"	11.5

COMPARATIVE DRAINAGE AREA PER SHOT



PENETRATION IN OPEN HOLE SHOOTING WITH GLASS GUN

OPEN HOLE SIZE	GUN SIZE	TYPE CHARGE	INCHES PENETRATION IN FORMATION
6"	4⅝"	GG4	16
6"	5½"	GG7	18

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"First in Oilfield Acidizing . . . Since 1932"

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FOR OIL INDUSTRY CHEMICAL SERVICE

as Co. in Latin America, St. Hilaire has been active in the petroleum industry for the past 17 years.

Tulsa Testing Lab Names New Department Heads

Tulsa Testing Lab has announced formation of two new departments. A new geological department is headed by Ernest Appel. Marshall Travis has been employed to head the nondestructive and physical testing department.

The petroleum department, which deals with hydrocarbon analysis, crude evaluation, analysis of reservoir fluids, etc., has added John R. Harn, formerly with Stanolind Oil & Gas Co. in Brownsville, Tex., and Larry Vendergriff, formerly with Core Laboratories, in Farmington, N. M., to its staff. The chemical department is now headed by W. A. Hubler, who retired from Dowell Incorporated recently.

The geological department will offer well sitting, well logging, electrical interpolation and correlation, mapping, porosity determination, and seismograph interpolation and correlation.

The nondestructive and physical testing department is primarily concerned with magnetic-particle inspection on refinery equipment, pipe-line material, and drilling equipment. Travis was previously connected with Glad Oil Co., and owned and operated his own lab.

D. E. Noble to Address A.G.A. Annual Conference

Daniel E. Noble, vice president in charge of Motorola's communications and electronics division, will address the American Gas Association's annual convention October 26 to 28 in St. Louis. The subject of Noble's talk will be "Electronics—A Tool for Communications and Control in the Gas Industry."

The recent rapid strides in the development and application of VHF mobile two-way radio, multichannel microwave, carrier, and supervisory control systems for the gas industries will be discussed.

Magcobar Announces Sales, Engineering Appointments

Magnet Cove Barium Corp. has announced the appointment of a special sales representative for the Houston area, and two new engineering consultants.

John H. Moran, who has been a salesman in the Texas Gulf Coast division since 1949, has been named special sales representative.

Robert B. Hyde, Jr., will serve as a technical and industrial engineering consultant. He has been with Magcobar since graduating from Texas A. & M. in 1949, and was formerly district manager in Oklahoma City.

Wallace W. Frazer has been appointed an engineering consultant in Magcobar's Denver office. He received his degree from Stanford University.

Edco Pipe & Supply Co. Announces Office Move

Edco Pipe & Supply Co., of Tulsa, has announced the removal of its office from the Tuloma Building to the Wright Annex Building as of September 1. This will enable the Edco Co. to more efficiently handle its business in the Mid-Continent area.

The company yard in Drumright, Okla., will be maintained as well as the Tulsa office where Edward N. Cohn, owner, will be in charge.

No "flame-out" with McKissick... power steady as a jet!
McKISSICK
TRAVELLING BLOCK
for superior performance
Center or divider plate between each sheave minimizes center pin deflection.
Heavy steel construction throughout for extra weight.
All McKissick blocks are equipped with Johns-Manville Klipper Seals.
READILY ADAPTABLE TO ALL POPULAR HOOKS
(Illustrated is McKissick block with Webb-Wilson Hook)
Hydra Hook
McKISSICK
McKISSICK PRODUCTS CORPORATION
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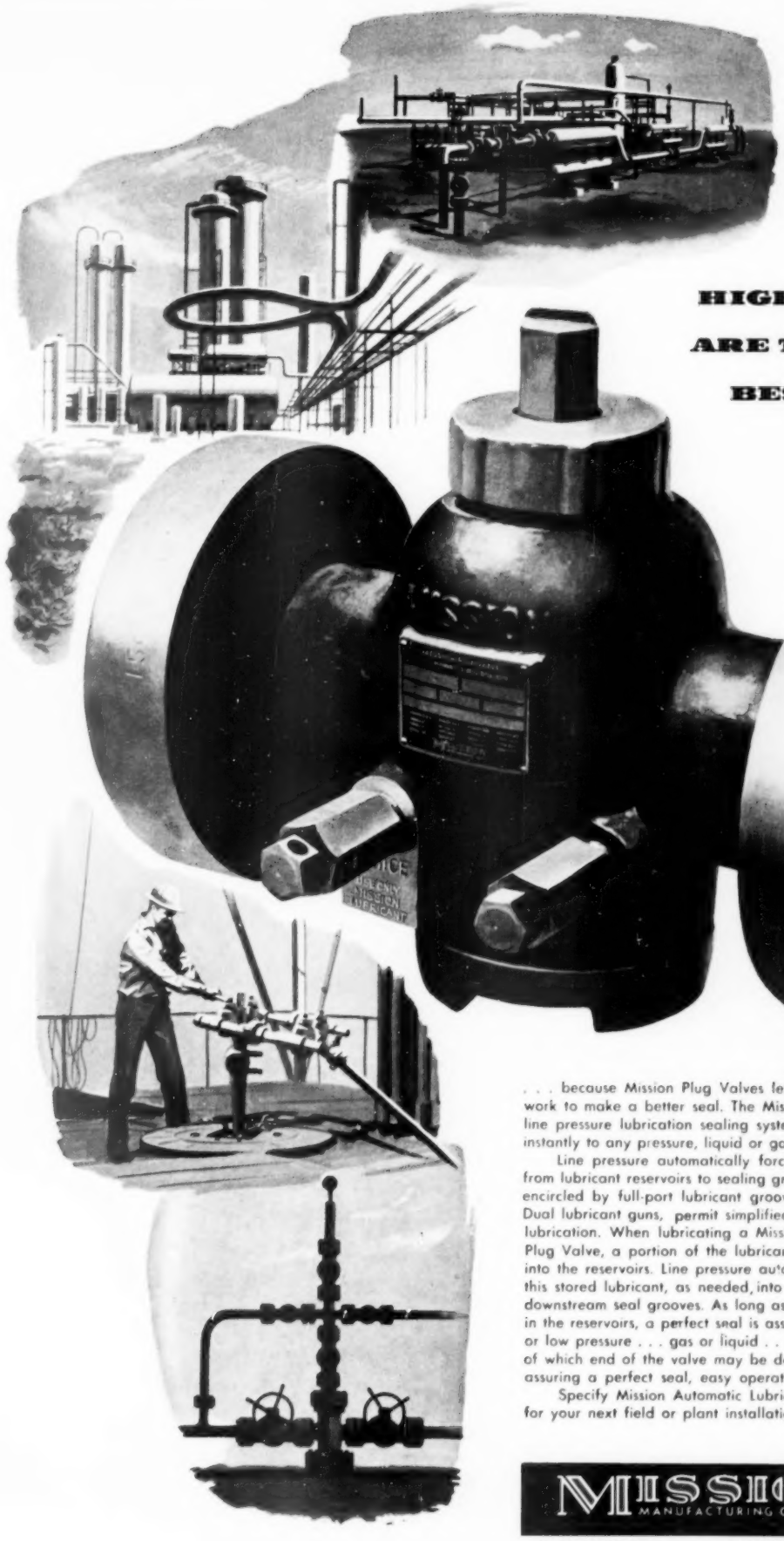

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. . . because Mission Plug Valves let line pressure work to make a better seal. The Mission line pressure lubrication sealing system responds instantly to any pressure, liquid or gas.

Line pressure automatically forces lubricant from lubricant reservoirs to sealing grooves. Both ports are encircled by full-port lubricant grooves. Dual lubricant guns, permit simplified selective lubrication. When lubricating a Mission Plug Valve, a portion of the lubricant is forced into the reservoirs. Line pressure automatically feeds this stored lubricant, as needed, into the downstream seal grooves. As long as lubricant remains in the reservoirs, a perfect seal is assured in high or low pressure . . . gas or liquid . . . regardless of which end of the valve may be downstream, thus assuring a perfect seal, easy operation.

Specify Mission Automatic Lubricated Plug Valves for your next field or plant installation.

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The first line of reducers is still the foremost line

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Old timers will recall the day—more than 20 years ago—when Taylor Forge announced the first comprehensive line of butt-welding fittings.

Before the WeldELL line was introduced, the only available welding fittings were elbows. But in the WeldELL line came all the fittings needed to do a complete and workmanlike job of pipe welding . . . the tees, reducers, caps, stub ends, and welding flanges.

To produce all of these types of fittings in seamless forged steel was a giant undertaking—and still is. A good example of this is the line of reducers. Today there are 175 reductions in standard weight reducers alone—and this can be multiplied by all the weights and materials in which Taylor Forge reducers are available.

The first line is still the foremost line—the engineered line, the full value line. For up-to-the-minute facts about the WeldELL line, see your Taylor Forge Distributor.

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Plants at: Carnegie, Pa., Fontana, Calif., Gary, Ind., Hamilton, Ont., Canada

DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

TRADE LITERATURE

1 HEAT-EXCHANGER CALCULATOR for use in selection of shell-and-tube-type heat exchangers is packaged in an attractive folder and protective envelope, complete with simplified operating instructions, including tables of tube surface areas measured in square feet. Designed like a slide rule, the handy two-color calculator is used to determine square feet of surface necessary to transfer a given amount of heat between oil or water on the shell side, and water on the tube side. *Young Radiator Co.*

2 NEW HORIZONS is the story of the complete refinery built by Lummus for Shell Petroleum Co. at Cardon, Venezuela. It is a picture story from initial planning to completion. Included is a simplified flow diagram showing operations from crude to finished products. *The Lummus Co.*

3 VALVES AND FITTINGS FOR THE OIL AND ALLIED INDUSTRIES. This 48-page brochure describes and illustrates wedge gate, swing check, and globe stop valves, valves for meter service, level-gage cocks, and level indicators. Specifications and design are given on each item described. A loose-leaf specification folder on screwed front pattern gages is included. *Sydney Smith & Sons, Ltd.*

4 AUTOMATIC pH CONTROL IN WATER AND INDUSTRIAL WASTE TREATMENT is a reprint of a paper by R. T. Sheen, president of Milton Roy Co. Outlined are several typical systems of automatic pH control in boiler feed-water treatment, using air and motor-operated valves as well as controlled volume pumps to effect proper addition of chemicals. Several diagrams of actual installations illustrate the bulletin. *Milton Roy Co.*

5 BULLETIN B-100 describes advantages of cemented tungsten carbide for balls and seats in subsurface pumps employed in the petroleum industry. Bulletin includes information on abrasion, corrosion, and impact resistance of carbide in addition to its composition and manufacture. *Carboloy Department, General Electric Co.*

6 MODEL 25 FORCE-FEED LUBRICATORS. This catalog discusses new high-pressure force-feed lubricators designed for service up to 30,000 lb. Model HP20 has pump assembly with 5/16-in.-diameter plunger and will pump 6½ drops of S.A.E. 40 oil per stroke against 20,000 psig. Both units are directly connected to gear motor and attached to rigid base. *Manzel Division, Frontier Industries, Inc.*

7 AN INTRODUCTION TO FLOWRATOR METERS, a 16-page catalog, discusses flowrator meters and presents objective comparisons between variable-area types and more common variable-head meters. How variable-area meter works, its basic flow equation, as well as data on calibration scales, metering range, permanent pressure loss, purging, and pulsating flow, are all discussed. *Fischer & Porter Co.*

8 THE NEW DIESEL ENGINE FOR HEAVY-DUTY WORK is an attractive colored illustrated brochure describing Series 105 one, two, three, and four-cylinder diesel engines developing 11, 22, 33, and 44 b.hp. at 1,500 r.p.m. normal output to B.S.S. 649/1949, and available in more than 30 different versions of every size, all

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41 42 43 44 45 46 47 48 49 50

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Sept. 28, 1953

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CITY ..... ZONE NO. ..... STATE .....
NAME ..... TITLE .....

OIL AND GAS EQUIPMENT Digest

of which are fully standardized, based upon modern fluid production principles. *Bolinder-Munktell.*

9 HIGH-VACUUM APPLICATIONS. This new 60-page bulletin includes factual data on planning high-vacuum system; connections and speed evacuations; selection of high-vacuum pumping systems; low-pressure technique, as well as illustrations and descriptions of various types of high-vacuum pumps, oil diffusion pumps, vacuum gages, and vacuum accessories. *Central Scientific Co.*

10 INDUSTRIAL THERMOMETERS. Bulletin E-2, a 16-page catalog, presents technical data, details of construction, temperature scale ranges, and various forms of mercury-in-glass industrial thermometers in conventional 7, 9, and 12-in. sizes. Included also is complete listing of thermometers for installation in ducts, piping, and pressure vessels, while center spread features thermometers of separable socket type and includes completely dimensioned sketches of all standard sockets for convenient selection. *Precision Thermometer & Instrument Co.*

11 HOW TO OPERATE A LIFT TRUCK. The two-color cartoon technique used in this booklet is designed for easy reading and is packed with information about the operation of a lift truck, preventive maintenance, safety and basic materials handling. Drawings for setting up an obstacle course are also included. *Hyster Co.*

12 RECTIFIER TYPE D. C. WELDER, a four-page folder, describes new SR line of welders, their magnetic amplifier principle, "pulsating direct current" principle, details of design and construction. Illustrated also are specialized applications — remote control, specialized control, parallel operation. *Miller Electric Manufacturing Co.*

13 GYROL FLUID DRIVE is a new 2-color, 24-page bulletin covering Type VS, Class 4 Gyrol fluid drive. Its attractive and unique design permits quick, easy reading and covers such subjects as applications, advantages, features, selection, and dimensions. *American Blower Corp.*

14 RdF STIKON THERMOMETER ELEMENT WITH ELECTRONIK RECORDER for rapid and accurate measurement of surface temperatures in the range of —100° to +400° F., even under extremely restricted space limitations, are described in Instrumentation Data Sheet 10.1-3. Elements are cemented to any smooth surface, and temperature read directly. *Minneapolis-Honeywell Regulator Co.*

15 FREE-VANE ELECTRONIC CONTROLLERS. Bulletin No. B226 describes and illustrates latest additions to Series 500 line of instruments, available as indicating or recording controllers for temperature, pressure, flow, liquid level, humidity, and time program. Complete data on unique frequency modulation principle of control unit, examples of applications, and engineering specifications are contained in the booklet. *The Bristol Co.*

16 LOG 200 TEMPERATURES IN MINUTES is a new four-page folder which illustrates and describes a new electronic console indicator that saves panel space and helps operator speed up logging of thermocouple temperatures. Photographs illustrate design features, as well as complete specifications, ranges, and dimensions for three available types of indicator. *Leeds & Northrup Co.*

17 CLEAN SEPARATION BETWEEN LIQUID AND VAPOR WITH YORKMESH DEMISTERS, a four-page bulletin, completely describes through illustrations and text how these entrainment separators and mist eliminators for improving performance of vacuum towers, distillation equipment, gas absorbers, scrubbers, separators, and evaporators are constructed, how they work, and how they are applied. *Otto H. York Co., Inc.*

18 PORTABLE AIR COMPRESSORS. Bulletin E-247 includes photographs and brief specifications of 60-105-160-210-315-500-600-cu. ft. per minute models. Davey gasoline, diesel, and electric-powered compressors are described in skid, two-wheel, and four-wheel design. *Davey Compressor Co.*

FOR MORE INFORMATION . . . . use one of these cards.

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Sept. 28, 1953

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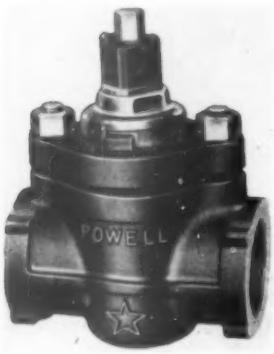
DIGEST OF NEW EQUIPMENT

IT'S NEW ✓ CHECK IT

by Dan B. Miller

19 NEW LUBRICATED PLUG VALVES. A new line of semisteel and steel lubricated plug valves is offered featuring quick and positive shutoff. All are wrench-operated and require only a quarter turn to open or close the valve. Lubricant grooves surrounding each port provide a positive seal when these precision built valves are closed. In an open position, seating surfaces are not exposed. Lubricated plug valves are available with screwed or bolted glands. The semisteel valves are available for 175 and 200 lb. w.o.g. Carbon steel valves are available for 150 and 300 lb. w.p. *The Wm. Powell Co.*



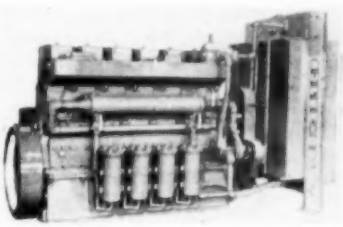
IT'S NEW ✓ CHECK IT

20 TOURNAROPE BANTAM REEL. A cable reel for dozer use, designed to eliminate wastage of large quantities of wire rope due to the wearing out of small sections, holds 150 ft. of ½-in. Tournarope. It is designed as a storage reel and is equipped with a bracket that can be welded or bolted on a tractor. The Tournarope is threaded through the dead-end unit, through the sheaves and to the power control unit. When a section of rope shows wear, usually at the power control unit point, it is cut off, and an amount of Tournarope equal to the section cut off is pulled from the storage reel, and reattached to the power control unit. *Le Tourneau-Westinghouse Co.*

21 NEW ION-RESONANCE MASS SPECTROMETER. A new mass spectrometer designed specifically to meet process instrumentation requirements in the gas, petroleum, and chemical fields, uses the most recent development in mass spectrometry, the principle of ion resonance. In addition, a sample inlet system has been designed to allow direct connection to a stream or process line, thus allowing continuous sample introduction. Operation covers an approximate range of 1 to 100 mass units. Incorporated into this new G.E. equipment is a programing device which allows: automatic and repetitive continuous scanning of the spectrum; manual scanning or selection of peak or peaks of a given mass; and, with minor modification, automatic monitoring of one or more peaks in sequence. *General Electric Co.*

IT'S NEW ✓ CHECK IT

22 NEW GAS ENGINE. The new superior Model G-825 gas drilling engine, is available in either six or eight-cylinder units. This 10 by 10½-in., six-cylinder engine has a continuous b.hp. rating for drilling service of 450 at 900 r.p.m. For the same service the eight-cylinder model is rated 600 b.hp. at 900 r.p.m. The engine is equally suitable for generator drives and industrial use. Many parts on the G-825 are interchangeable with those used on the Superior Model PTD diesel drilling engine. Another feature is the interchangeability of both type engines on the same drilling-rig drive skids. The G-825 is equipped with air starting, oil-cooled pistons, and with pressure lu-



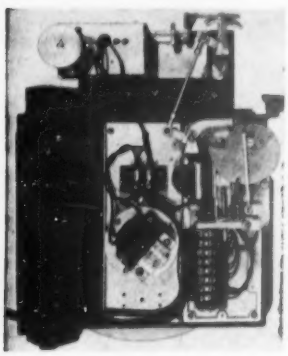
KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.

brication to main and connecting-rod bearings. Removable cylinder liners are honed for accurate piston fit, valves have insert seats, and exhaust manifolds are water cooled. The engines are equipped with high-tension magneto spark ignition, oil-bath air cleaners, full-flow lube-oil filters, a shell-and-tube lube-oil cooler, shut down relays that operate on excessive lube-oil and cooling-water temperatures and the necessary gages, thermometers, and tachometer. *National Supply Co.*

IT'S NEW CHECK IT

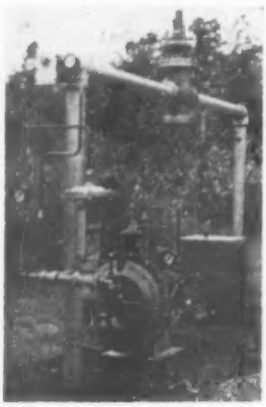
23 A NEW ELECTRONIC TYPE FLOW METER makes use of mercuryless bellows-type transmitters. This meter is available in several different models for indicating, recording and with a continuous-type mechanical integrator or combinations thereof for measurement of the flow of fluids such as steam, water, and other fluids and gases. Records of air flow for boiler operation and pressures and temperatures can be combined in the same meter. The differential pressure transmitters used with the meter are of the metallic bellows, ruptureproof type for differentials of from 20 to 750-in. water with a standard static operating pressure of 1,500 psig. Higher pressure ratings can be supplied if required. The meter is also available for the measurement of liquid level in an enclosed vessel, such as a boiler drum. The transmission system employed between the transmitter and recorder makes use of differential transformers and a null balance a.c. system independent of line voltage variations. An electronic amplifier in the circuit of the meter assures maximum sensitivity and a great speed of response. The six-counter integrator is continuous in operation and simple in mechanical construction. *The Hays Corp.*



IT'S NEW CHECK IT

24 NEW THICKENER FOR MULTIPURPOSE GREASES. Permagel, a new thickening agent for making high-quality multipurpose greases, is an entirely inorganic purified colloidal form of the mineral attapulgite. It is claimed to have the ability to yield lubricating greases with such qualities as: excellent low-temperature pumpability, no melting or dropping points, excellent physical stability, outstanding mechanical stability, good water-washing resistance, effective corrosion resistance, and excellent bearing performance. The product has the ability to gel a wide range of petroleum-base oils and synthetic lubricants. In addition, Permagel greases can be produced at relatively low cost per pound of finished grease. The materials uniformity insures grease reproducibility, and it lends itself well to continuous processing at high capacity. Complete technical assistance is offered in the development of Permagel-thickened greases, including samples of the material for laboratory evaluation, and complete pilot-plant facilities for evaluation work on base oils submitted by prospective users. *Attapulgus Minerals & Chemical Corp.*

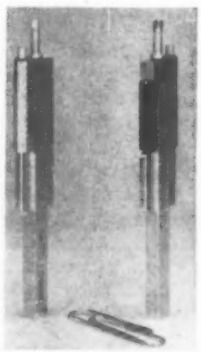
IT'S NEW CHECK IT



25 TEXTROLLER TEMPERATURE-OPERATED INJECTOR CONTROL hookup was devised primarily to control the injection of alcohol, methanol, and similar antifreeze solutions into the stream when the temperature of the stream dictated the need for the solution. The operation is simple and installation is easy to make. The Textroller is a temperature-operated pilot. The bulb for the pilot is installed into the stream where the control point is to be taken. The range of the Textroller is from 0° to 150° F. The temperature control point is set 5° to 10° above the hydrate point of the freezing point. When the temperature of the stream falls to a critical point the Textroller opens and pressure is supplied to the motor valve, and line pressure then actuates the gas-operated pump. If the temperature continues to fall (10° F.) the pilot opens the motor valve further and allows the pump to operate faster thus injecting more antifreeze. When the temperature of the stream rises above the set temperature point the pilot closes the motor valve, stops the pump, and ceases to inject antifreeze when the temperature of the stream does not require it. *Texsteam Corp.*

IT'S NEW CHECK IT

26 NEW SERIES 7-300 RECORDING GALVANOMETERS. Improved techniques of balancing and a completely redesigned suspension system are combined in this new series to give unusually rigid control over linearity, sensitivity, damping balance, and zero stability. Fourteen individual models in the series offer flat frequency ranges from 0.11 to 0-3,000 cycles per second. Undamped d.c. current sensitivities range from 4.6 μa. per inch to 40 ma. per inch. Electrically, the new galvanometers are completely interchangeable with Consolidated's Series 7-200 galvanometers. The one-piece construction and a fixed window behind the lens turret provide a positive seal against dust, moisture, and other foreign matter. Rotatable lens mounts permit use in oscillographs of different optical bases. *Consolidated Engineering.*



IT'S NEW CHECK IT

TWICE AS MUCH FLUID OPENING

with the GUIBERSON FUL-FLO SQUARE KELLY

Guiberson's Ful-Flo Square Kelly gives you *more than twice* the fluid opening of conventional bored forged kellys. This means more volume circulated with less pump pressure. Kelly is designed to work smoothly with Guiberson Drilling Heads as well as in conventional rotaries. Ful-Flo kelly is ideal for drilling, reverse circulation and clean-out jobs.

MORE ADVANTAGES

- Feeds easily through kelly bushing because of smooth, straight sides.
- Won't whip because it's perfectly balanced.
- Less wear—passes easily through the packing rubber.
- Gives maximum flow—smooth liner tube walls with no offsets or restrictions. (Take a look through one!)
- Greater stability and perfect balance reduce wear on related drilling equipment.

Built like a truss, the Ful-Flo Square Kelly is *extremely strong*, but with *less weight*. Square, seamless outside tubing is welded securely to seamless liner tube. Every kelly is tested at 3,000 PSI.

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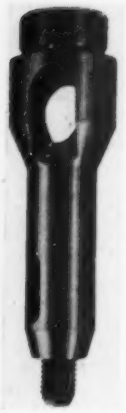


27 NEW STANDING VALVE PULLER. A positive-acting, highly simplified, tap-type standing valve puller consists of only five parts: body, housing, spring, key pin, and tap. Any of these parts may be changed in the field. As a result, the unit does not have to be discarded when only one or two parts are worn. The new standing valve puller fits all A.P.I. cage, plunger, and cup body sizes and is spring-loaded to protect the tap. The tap has ¾-in. standard A.P.I. "G-1" threads and is heat-treated for greater strength and resistance to wear. The new puller is also equipped with a stainless-steel spring to resist corrosion. These pullers are available in regular or stainless steel. *D+B Division, Emsco Manufacturing Co.*

IT'S NEW CHECK IT

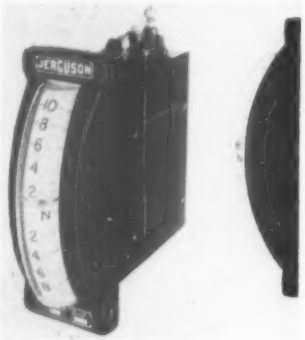
28 NEW LINE OF CLOSE-COUPLED CENTRIFUGAL PUMPS. A new line of close-coupled centrifugal pumps has been specially designed for reliable, efficient air conditioning and refrigeration recirculation. They are also adaptable for a wide range of applications including washing, circulation, transfer, sprinkling, and allied uses. Available in capacities from 5 up to 50 g.p.m. with heads to 105 ft., and horsepower from ¼ to 1½, the new pumps allow selection according to the exact performance required. They incorporate a standard N.E.M.A. motor frame, with permanently lubricated ball bearings, for single or 3-phase, 60-cycle current. Hydraulically balanced impeller and extremely short pump-mounting bracket minimize shaft vibration. Balanced design eliminates internal stresses. These low-cost vertically split, end-suction pumps employ a variable four-position discharge. They are equipped with a self-lubricated mechanical shaft seal that is both leakless and long lasting. The pump itself can be mounted horizontally, vertically, or at any angle. The casing can be rotated so that the discharge piping can be arranged in any of four different directions. *Marlow Pumps.*

IT'S NEW CHECK IT

29 NEW QUICK-ACTING VALVE. A speedup in filling L.P.-gas cylinders is claimed for a new quick-acting valve, which is designed for quick, full opening and rapid, positive closure. For use primarily on cylinder-filling manifold hoses, the valve can also replace wheel-handle shutoff valves on existing loading-hose assemblies. By means of a special plastic insert in the bonnet, cam action of the lever handle has been provided with an ideal friction-free bearing surface. Valve handle operates in a 90° arc, from full-open position (vertical) to fully closed position (horizontal). Valve handle can be swiveled horizontally to permit operation in any desired direction. Increased capacity and safer, longer operating life are two additional advantages of the No. 7553 series valves. *The Bastian-Blessing Co.*

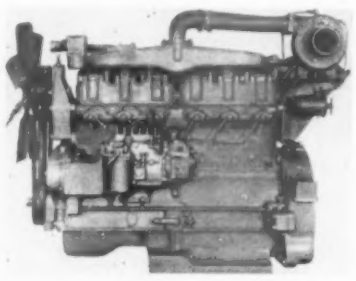
IT'S NEW CHECK IT

30 A NEW CONVEX TRUSCALE REMOTE READING GAGE permits full 180° visibility so it is possible to read the liquid level from anywhere in the control room from which the gage cover can be seen. The new convex scale is designed so that readings of the liquid level can be instantly taken from the front, or either side, without distortion. Scale markings are directly on the convex face. Indicator goes clear around the convex surface. It is possible to stand at one end of a control room and instantly check the whole lineup of gages. Truscales give instant remote readings of liquid levels of boilers, tanks, etc., with the amazing accuracy of 0.5 per cent of scale reading. Compensated manometric gage meets the new interpretation of the boiler code for pressures of 900 psi. or higher. Models are available for any pressure and range. Light and horn alarm signals, as well as Truscale Repeaters for repeating gage reading at auxiliary points are available. *Jerguson Gage & Valve Co.*



IT'S NEW CHECK IT

31 NEW 318-HP. TURBOSUPERCHARGED ENGINE. The new engine, designated DFXE-TS, has a 5⅝-in. bore by 6-in. stroke and 895 cu. in. piston displacement. The DFXE-TS develops 846 lb.-ft. torque at 1,800 r.p.m. and 318 hp. at 2,000 r.p.m. The nonsupercharged version of this engine has been successful in many different applications. The supercharged version fulfills the demand for more horsepower without increasing fan-to-flywheel length. The DFXE-TS is particularly suited to power construction equipment, oil-field machinery, and other equipment in the 300-hp. class where a compact engine is important. Engineering features include: forced-feed lubrication by gear pump to all connecting rods, main bearings, piston pins, and rocker-arm bearings; exhaust-driven supercharger, and intake air heater for cold starting aid, burning fuel oil or ether. *Hercules Motors Corp.*



NATURAL GAS

Court Orders Natural Gas To Pay Higher Gas Price

OKLAHOMA CITY.—Natural Gas Pipe Line Co. has been ordered by the Oklahoma Supreme Court to pay a $1,300,000 judgment to Panoma Corp. for natural gas produced in the Guymon - Hugoton field in Texas County.

In 1946 the Oklahoma Corporation Commission set the field's price at 7 cents per thousand cubic feet, and the order was upheld by the state Supreme Court. However, Natural Gas refused to pay the new price, claiming that a state agency could not change a prior contract. Panoma appealed to the commission for the higher rate and was granted judgment for the gas purchased by Natural Gas.

In July 1952 the price for the field was raised to 9.8262 cents per thousand cubic feet.

Storage Project Under Way

SAYRE, Okla.—Oklahoma Natural Gas Co. is reconditioning some wells and plugging others in the nearly depleted Sayre gas field in Beckham County in a project which will convert the field to gas-storage reservoir.

About 20,000,000 cu. ft. of gas from wells outside the unit zone of nearby Elk City field will be stored in the reservoir. The project is expected to be completed and in operation by mid-December.

Permission to convert the field to storage operation has been granted by the Oklahoma Corporation Commission.

Sayre field was discovered in July 1922. Since then it has produced more than 86,000,000,000 cu. ft. of gas. O.N.G. engineers estimate the field now is 97 per cent depleted.

June Output Drops Sharply

AUSTIN.—Gas production in Texas dropped about 13,205,969 M.c.f. during June, reports the Texas Railroad Commission.

June's output totaled 418,890,955 M.c.f. as compared to 432,096,924 M.c.f. for the preceding month. From this decreased amount transmission lines claimed 266,470,472 M.c.f., of which 172,708,460 M.c.f. was exported.

The remainder of the gas went for cycling, 41,332,183 M.c.f.; plant fuel and lease use, 33,673,417 M.c.f.; pressure maintenance and repressuring, 24,253,369 M.c.f.; venting, 20,635,583 M.c.f.; carbon black, 16,825,589 M.c.f.; extraction loss-plants, 15,278,529 M.c.f.; and plant-meter difference, 421,813 M.c.f.

NATURAL GASOLINE

Little Beaver Plant Planned

DENVER.—R. A. Goodall, an independent operator, has announced here that he may build a natural-gasoline plant in Little Beaver field, in Adams and Washington counties, Colorado, for processing gas produced in that area.

Lion Oil Co. and Continental Oil Co. are reported to be negotiating with Goodall for an interest in the proposed plant.

Works Begins on Cycling Plant

SWEETWATER, Tex.—Midwestern Constructors, Inc., Tulsa, has started work on a $500,000 cycling plant in Rowan & Hope field near here.

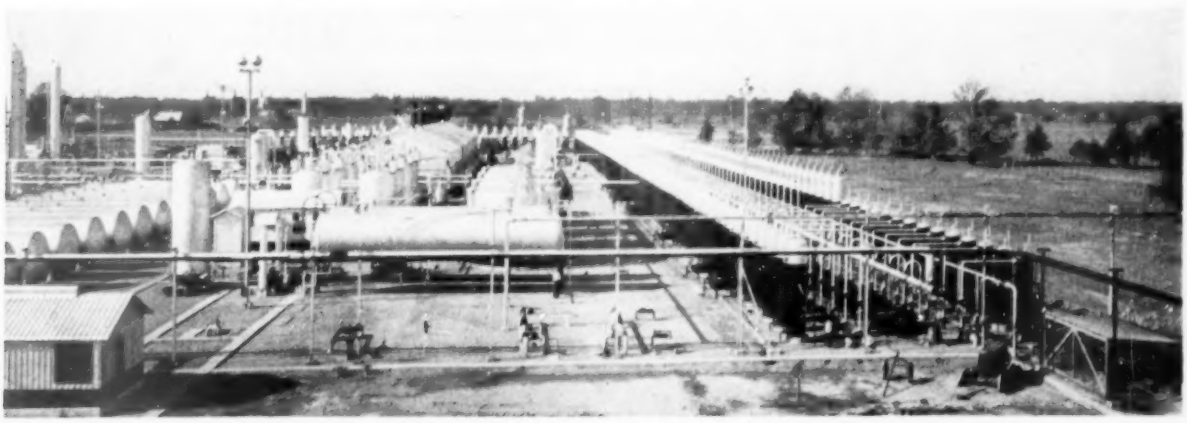
The plant, which is being built on the northwest corner of the city airport, is expected to be completed by November 1. It will produce gasoline, butane, and propane from 2,250,000 cu. ft. of wet gas daily *(The Oil and Gas Journal, June 29, page 139)*.

In the nearby 30-well White Flat pool, operators are discussing plans to build a plant similar to the one being built in the Rowan & Hope field. The proposed plant would be designed to stop wastage in compliance with a Texas Railroad Commission order *(The Oil and Gas Journal, September 14, page 173)*.

Sinclair Project Under Way

TULSA.—Sinclair Oil & Gas Co. has started work on a 100,000-bbl. L.P.G. underground-storage project in Seminole County, Oklahoma.

The shallow cavity is being mined out of a shale formation. It is anticipated that the $490,000 project will be completed and in operation early next summer.



Conoco's Ville Platte Plant in Fourteenth Operating Year

Continental Oil Co.'s Ville Platte, La., natural-gasoline plant, which has been in operation over 13 years, produced 547,619 bbl. of L.P.G. and processed 24,106,000 M.c.f. of gas last year. Shown are plant's separators batteries, storage tanks, compressor station, and pump house.

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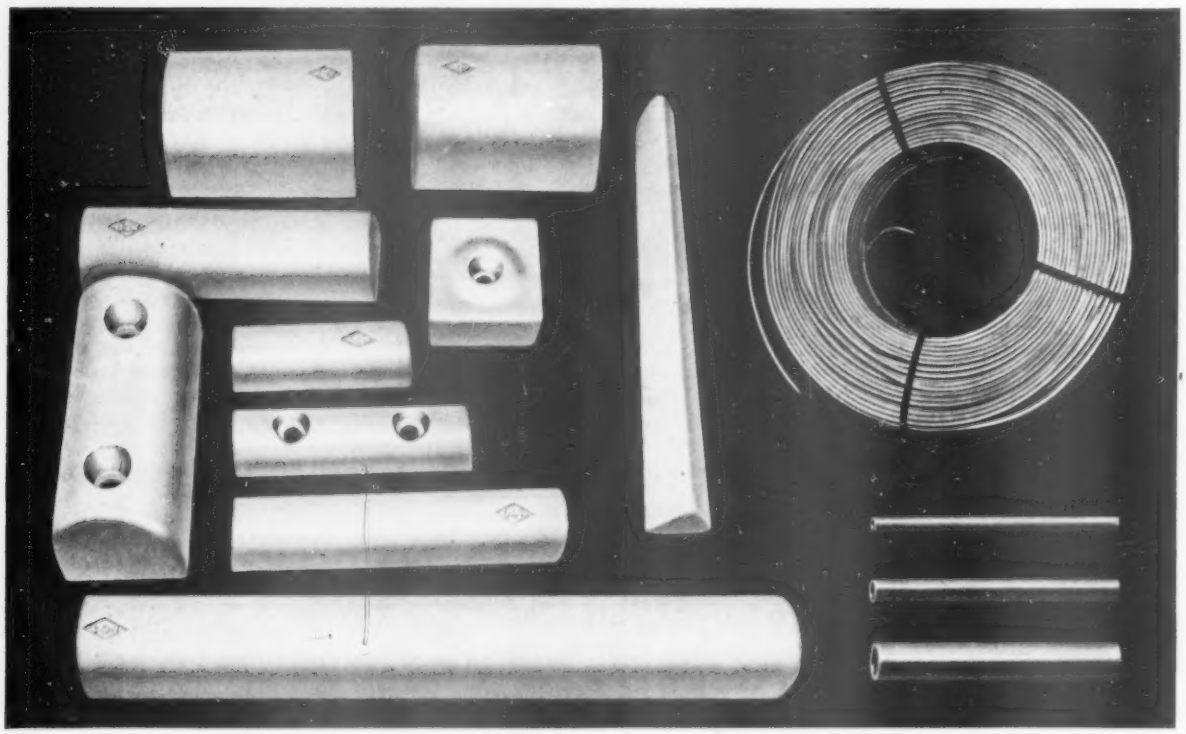
A large variety of shapes and sizes are available to meet your specific corrosion requirements



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Dow has established a cast magnesium anode system based on uniform "D" cross-section anodes. This provides standardized shapes and sizes for your ease of ordering, installation, and inventory economy.

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DOW

PIPE LINE

Contracts Let

Four contractors to build Yellowstone products line

BILLINGS, Mont. — Contracts for construction of the 540-mile, 10-in. Yellowstone products line from Billings to Spokane have been awarded to four contractors by Continental Pipe Line Co.

Construction, which will be handled by Continental through the staff of the newly organized Yellowstone Pipe Line Co., has been divided into six sections. Ross & Powers, of Billings, was given the pipe-laying contract for the first section, which will stretch for 130 miles from Billings to Bozeman, Mont.

The second and third sections, which will cover 95 and 75 miles respectively, will be laid by Associated Pipe Line Contractors, Inc., Houston. These extend from Bozeman to a point near Helena, Mont., and on to the vicinity of Clinton, Mont. Eastern Pipe Line Field Service Co., Dallas, will lay the 76-mile fourth section from near Clinton to Perma, Mont., and will also handle pipe laying on the fifth section, which runs 81 miles from Perma to Murray, Idaho.

The last 83 miles to Spokane will be laid by Engineers Limited Pipe Line Co., Denver. All construction will begin as soon as pipe deliveries are made in mid-October.

Completion delayed . . . Completion date has been set for September 1954, several months later than originally planned, to allow ample time for clearing of the right-of-way. This change was necessitated because the original construction schedule was considered too tight by the bidders causing "premium" bids to be submitted.

The $20,000,000 line, which will have a capacity of 30,000 bbl. daily, will be owned by Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co. of California, and the H. Earl Clack interests. Continental and Union will have 42 per cent ownership with Union holding 10 per cent, and Clack, 6 per cent. *(The Oil and Gas Journal, September 7, page 153).*

New Firm to Build Sunray's 440-Mile Products Line

TULSA.—A new firm, Oklahoma-Mississippi River Products Pipe Line, Inc., is being organized to construct and operate the 440-mile, 10-in. products line from Duncan, Okla., to West Memphis, Ark., which was announced recently by Sunray Oil Corp.

Officers of Sunray are conducting the preliminary organization of the new corporation, in which Sunray will have a major interest.

The proposed line will run from Sunray's 33,600-bbl. refinery at Duncan through south central Oklahoma and enter Arkansas at Fort Smith. From there it will pass near Conway and north of Little Rock on to the Mississippi River.

Presently, the engineering firm of Ford, Bacon & Davis, Inc., New York, is purchasing the right-of-way for the new line, and negotiating with pipe-line contractors. Williams Brothers, Tulsa, has been awarded contract to lay the eastern 75 miles of the line.

Humble Replacing Old Crude System With 18-In. Line

HOUSTON.—Humble Pipe Line Co. has started construction on a 40-mile, 18-in. crude line from the company's Longview compressor station in Gregg County, Texas, across Harrison County to Caddo Parish in Northwest Louisiana.

The new line, which will have a capacity of 150,000 bbl. daily, will replace two 22-year-old 10-in. lines. The latter system has a daily capacity of 100,000 bbl.

Construction, which is being handled by Panama-Williams Construction Co., is expected to be completed within 3 weeks.

New Company to Lay Colorado Crude Line

DENVER.—Goodall Pipe Line Co., a newly formed organization, is purchasing right-of-way for a 25-mile, 8-in. crude line from Badger Creek to Merino, Colo.

A proposed gathering system in the Badger Creek, Little Beaver, and Middlemist fields, located in Adams and Washington counties, will transport between 12,000 and 18,000 bbl. of crude daily into the line. At Merino the crude will enter Toronto Pipe Line Co.'s system for transportation to Gurley, Neb. There the crude will enter Platte Pipe Line Co.'s recently completed 940-mile, 20-in. line for further transportation to the Wood River, Ill., refining region.

The new company, incorporated this

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Nozzle sizes from 1/4" to 24" — ASTM A234

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month in Nebraska with headquarters at Omaha, is owned by R. A. Goodall of Ogallala, Neb., and Sinclair Pipe Line Co., which will handle the engineering and construction of the proposed $1,000,000 crude system. Goodall holds the major interest in the corporation and will serve as its president. Also, the Nebraska independent operator plans to build a natural-gasoline plant in Little Beaver field *(see page 165)*.

Permian Pushes Construction On 285-Mile Gas System

MIDLAND, Tex.—Permian Basin Pipe Line Co. has completed over 170 miles of the 285-mile natural-gas system connecting Spraberry Trend and New Mexico producing areas with El Paso Natural Gas Co.'s transmission line in Yoakum County, Texas.

The most recent completion was 96 miles of 30-in. line between Denver City and here last week. During this operation 61 welders from R. H. Fulton & Co. made 783 welds during a single day to set a new high in pipe-line construction.

With most of the construction in New Mexico nearly completed, the entire project is expected to be ready to transport 300,000,000 cu. ft. of gas daily to Yoakum County in December. There El Paso will deliver the gas to Dumas, Tex., where Northern Natural Gas Co. will pick it up for further delivery to midwestern markets *(The Oil and Gas Journal, May 11, page 163)*.

Phillips Finishes Loop Lines

BARTLESVILLE, Okla.—Phillips Pipe Line Co., a wholly owned subsidiary of Phillips Petroleum Co., has completed 44 miles of 10-in. loops on its products line between Paola, Kans., and East St. Louis, Ill.

This construction will increase the capacity between these two points about 76,500 bbl. daily on the company's Texas-East Chicago, Ind., products system.

Humboldt-Chicago Lets First Contract for Salvage Project

TULSA.—A. C. Holder Construction Co. has been awarded the first contract in Humboldt-Chicago Pipe Line Project's salvage operation on 1,600 miles of the old Sinclair Pipe Line Co. Kansas-Illinois line.

Holder will take up 150 miles of 8 and 12-in. pipe along the line, which runs from Humboldt, Kans., to a point near Chicago. Humboldt-Chicago purchased the pipe recently when Sinclair replaced the system with a 22-24-in. line from Cushing, Okla., area to East Chicago, Ind. The new owners are River Construction Corp., Mid-States Pipe & Supply Co., and Rogers & Wright *(The Oil and Gas Journal, June 15, page 178)*.

Texas Pipe Line Co. Awards Contract for Crude Lines

HOUSTON.—Panama-Williams Co. of Houston has been awarded a contract to construct 65½ miles of crude lines and seven gathering-line pumping stations in South Louisiana by Texas Pipe Line Co.

The firm will lay 34 miles of 12¾-in. line from Golden Meadow to Houma, La., together with 26 miles of 8⅝-in., 3 miles of 6⅝-in., and 2.6 miles of 4½-in. gathering lines in Leeville, Bay De Chene, and Golden Meadow pools.

Six gathering pump stations mounted on pilings over water are included in the contract, together with one gathering pump station on land.

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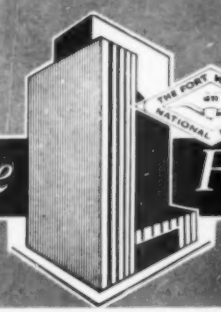

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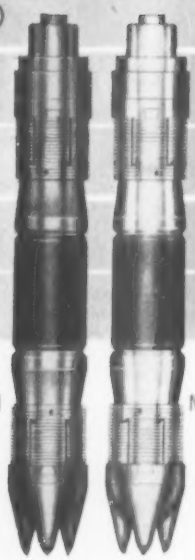

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Among the Drilling Contractors

Tulsa Group Organizes New Drilling Company

Organization of a new drilling company, Reed Drilling Co., Inc., with headquarters in the Philtower Building, Tulsa, has been announced by R. B. Reed, president and general manager.

Associated with Reed in the organization are Robert J. LaFortune, vice president; David A. Bartlett, treasurer; and Robert R. Lockwood, secretary. Robert W. Chriss is tool pusher.

Operations initially will be directed primarily to the Creek-Pawnee county area of Oklahoma. The company is starting with one rotary rig, capable of drilling to depths of around 4,000 ft. Currently, the rig is working in Creek County.

Sierra Drilling Co. has a 6,000-ft. wildcat test under way a mile east of Shroeder, in Goliad County, South Texas. It is a contract job with Morris Cannan and Wynn D. Miller the operators. Location is in the J. Carpenter Survey at 1 N. A. Kilgore estate.

Kern-Trimble Drilling Co., Magnolia, Ark., is committed to James G. Brown and associates of Chicago for a Cotton Valley test to be drilled on the south edge of the west segment of Smackover field, in Union County, Arkansas. Location, at 1 Henry, in 1-16s-17w, is about 4 miles southeast of Smackover townsite. Objective is expected around 4,300 ft.

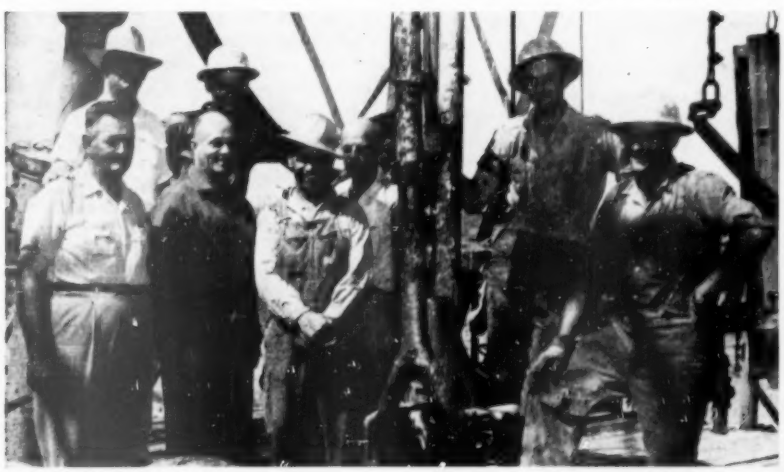
New Firm on First Job

Acorn Drilling Co., Tulsa, a newly formed contracting firm, is starting its first job, a semi-wildcat test in northeastern Okfuskee County, central Oklahoma. The test, 1 Smith, in 22-13n-10e, is for F. B. Murta & Son, of Tulsa. Pat Murta is president, and Frank B. Murta, secretary, of the new contracting firm.

Brewster-Bartle Drilling Co., Houston, has a contract for a 13,000-ft. wildcat to be drilled for Union Oil Co. of California in the Pecan Island area of Vermilion Parish, coastal Louisiana. It will be Union's 2 State Lease 1893 with location in 34-15s-1e.

Long Brothers Drilling Co. is drilling on a 6,000-ft. contract with David L. Gordon of Houston at a wildcat location 17 miles southwest of Hebbronville, in Jim Hogg County, Southwest Texas. The test is carried as 1 Sarita K. East. It is in the A. V. Prado Survey 42.

Gordon Drilling Co. has the contract for Union Oil & Sulphur Co.'s second test in the Church Point area, Acadia Parish, Louisiana Gulf Cost. The test, 1-B Harmon, is projected to



On a deep test Zephyr Drilling Corp., Tulsa, is drilling for Gulf Oil Corp. a mile north of Wickett, in Ward County, West Texas. At top left is W. H. (Bud) Fort, Zephyr tool pusher, with Jack Boop, roughneck, at his left. Others, left to right, are: W. C. Alford, Gulf's area drilling foreman; N. W. (Pete) Eaton, Zephyr's West Texas drilling superintendent; Clyde H. Ragsdale, driller; E. W. Lepley, Gulf's drilling foreman; Jack O. Joslin, and E. R. Underwood, roughnecks.

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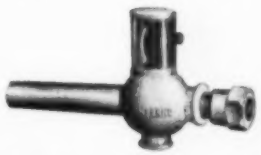

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10,250 ft. Union's first test, 1 Harmon, the discovery well, was completed last November as a gasser.

Scott Brothers have contracted for another wildcat test to be drilled for B. C. Mackey on the latter's City of San Francisco lease several miles west of the Antelope Hills field, in northwestern Kern County, California. Location is in 34-27-19.

Eastland Drilling Co. is drilling another wildcat test for Texas Pacific Coal & Oil Co. on the latter's Herndon lease 7 miles east of Sweetwater, in Nolan County, West Central Texas. The area is about a mile southwest of the Faver Ellenburger field. Hole is projected to 6,300 ft.

Petroleum Drilling Co. has the contract for an 8,000-ft. test which J. P. Petkas of Houston is starting 10 miles southwest of Three Rivers, in Live Oak County, South Texas. Location is on the Gayle lease in Section 61, Simmons Subdivision.

Sunnyland Drilling Co., Rayne, La., is drilling Phillips Petroleum Co.'s new 10,500-ft. outpost test, 1 Hains, at South Crowley, in Acadia Parish, southern Louisiana. Location is in 15-10s-1e.

Circle Drilling Co., Lake Charles, La., has contracted with Bel Oil Co. for another 8,600-ft. test in North Elton field, Allen Parish, Coastal Louisiana. The test will be the fourth for the operator in its Bel estate lease in 22-6s-3w.

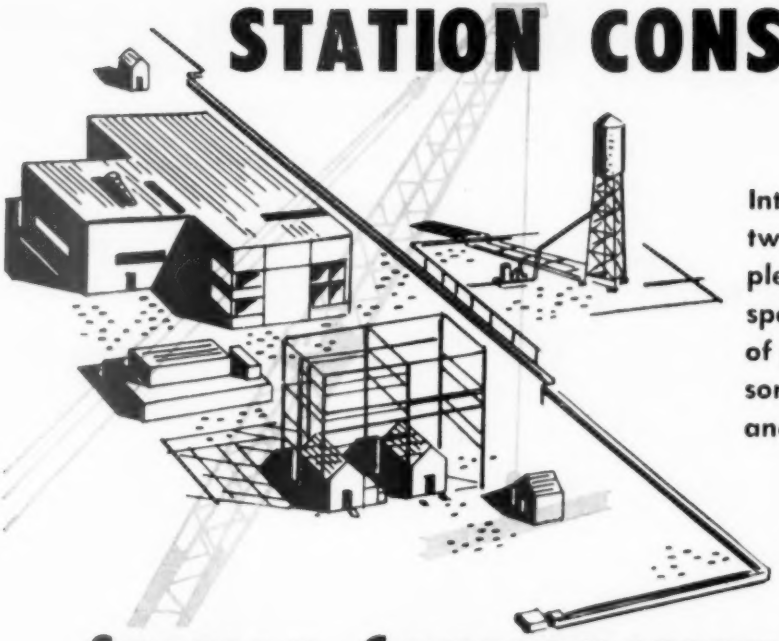
McKenzie Drilling Co. is contractor on a 5,000-ft. wildcat test South Texas Oil & Gas Co. is putting down northwest of the Wearden gas field, in northeastern Jackson County, Texas Gulf Coast. Location for 1 Hart is in Section 1, Block 1.

ACTIVE ROTARY RIGS*

Area	Week ended 9-21-53	Change week ended 9-14-53	Change week ended 9-22-52
Gulf Coast	533	+32	+ 18
N. & W. Tex.-N. M.	794	+ 4	+ 59
Ark.-N. La.-E. Tex.	193	+14	+ 55
Oklahoma	358	+ 7	+ 23
Kansas-S. Nebraska	151	— 3	— 7
Illinois-Eastern	150	+ 2	— 6
Rocky Mountains	264	—11	+ 12
Pacific Coast	174	+ 1	+ 14
Total U. S.	2,617	+46	+168
Western Canada	182	+ 5	— 4
Total	2,799	+51	+164

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown on pages 199 and 200.

STATION CONSTRUCTION



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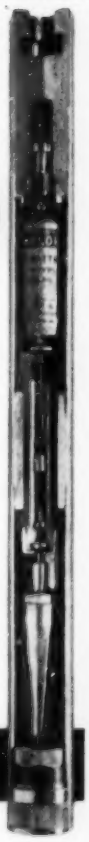

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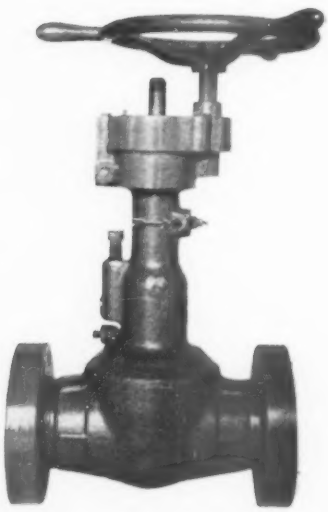

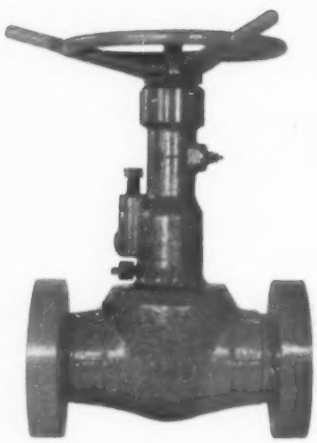

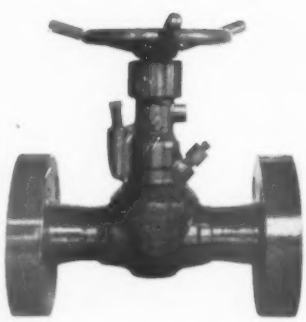

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REFINING

PAD Goal in Sight

Reports indicate desired boost in alkylate output

WASHINGTON.—Definite prospects that the oil industry will be able to meet the Armed Forces' program for alkylate for aviation have been developed by the Petroleum Administration for Defense.

The probability that the 30,000 bbl. per day expansion in alkylate facilities can be substantially attained without drastic action on the part of the Government, such as the building of alkylation units, is seen in the decision of PAD to defer, if not drop entirely, meetings with refiners tentatively scheduled for Chicago and California to follow the conference with eastern refiners held earlier this month in New York.

At the New York meeting, the companies agreed to make detailed studies of the cost of constructing the necessary facilities and the resulting cost of the product. Additionally, responses now being received to PAD's inquiry to some 450 refiners in August as to their feedstocks and present and potential alkylate productive capacity indicate that subtsantial new supplies can be developed.

Production lags . . . Although the military was given about $85,000,000 2 years ago to assist refiners in building new aviation-gasoline facilities to the extent of 30,000 bbl. a day, the program has lagged and is currently about 20,000 bbl. short of the goal. While present avgas supplies are adequate for current needs, the military is insisting that the full program be carried out against the possibility of an all-out war, and some weeks ago the matter was taken to the White House for consideration by the National Security Council.

As a result of NSC consideration, PAD was directed to press ahead with the program and to make a report by November 1 on what had been accomplished. It was intimated that in the event that industry could not or would not undertake the necessary expansion the government itself would step in and might go so far as to build its own facilities.

Dividends Up $1,000,000

WASHINGTON.—Publicly reported dividends of oil-refining corporations amounted to $493,100,000 for the first 8 months of the year against $492,100,000 for the same 1952 period, it was announced last week by the Commerce Department.

Dividend payments in August were $3,600,000 against $12,200,000 in August 1952, due largely to the fact that many concerns which paid in August last year have shifted dividend dates forward to September.

Pan-Am to Erect Alkylation Unit at Proposed Refinery

WASHINGTON. — Inclusion of a 2,960-bbl. per day alkylation unit in the new 25,000-bbl. refinery which Pan American Refining Corp. plans to build at Goodwin Neck, Va., has been approved by the Office of Defense Mobilization.

The company has been granted a certificate for accelerated amortization of the $2,900,000 of specialized equipment required and for 45 per cent of $280,000 for auxiliary equipment.

In other certificates approved recently by ODM, Southwestern Oil & Refining Co. was granted a 40 per cent writeoff of $389,000 for tanker and barge dock and loading facilities at the company's Corpus Christi, Tex., refinery.

Lummus Co. Gets Contract For Sunray's New Coker

TULSA.—Ucan Products Co. has awarded Lummus Co. of Houston construction contract for a 9,000-bbl. per day delayed coking unit at Sunray Oil Corp.'s Duncan, Okla., refinery.

Ucan, a Delaware corporation organized recently by Sunray and other interests, will own the new unit, which is scheduled to be in operation in late 1954. The coke products will be marketed through Great Lakes Carbon Co.

Recently the new firm, which will be operated by Sunray personnel, was granted a certificate of necessity to amortize 60 per cent of the $3,500,000 project. In addition to its coke production, the new plant will upgrade No. 6 fuel oil into such products as propane, propylene, butane-butylene, debutanized gasoline, and gas oil for additional catalytic charging stock.

Directors of Ucan include W. C.

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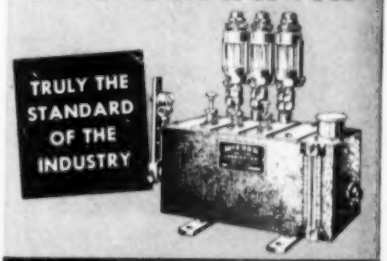

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Whaley, Paul E. Taliaferro, and R. J. Johnson, all with Sunray; Lloyd S. Gilmour of Eastman, Dillon & Co., a New York investment firm; and W. S. McConnell, Great Lakes Carbon Co. Taliaferro and Johnson will serve as president and vice president of the company respectively. Other officers, all of them connected with Sunray, are W. D. Forster, secretary; S. Price Gray, treasurer; and Burns H. Errebo, assistant secretary.

Ben Franklin Completing Big Expansion Program

ARDMORE, Okla.—Final stages in the major expansion of the Ben Franklin Refining Co. plant here will be completed October 1 when the third new unit to be added to the refinery, a feed-preparation vacuum unit, goes into operation.

A U.O.P. fluid cat cracker with a capacity of 5,000 to 7,500 bbl. daily and a polymerization unit recently completed went on stream earlier this month. The three new units will increase the refinery's output from 7,000 bbl. daily to 12,000 bbl. daily.

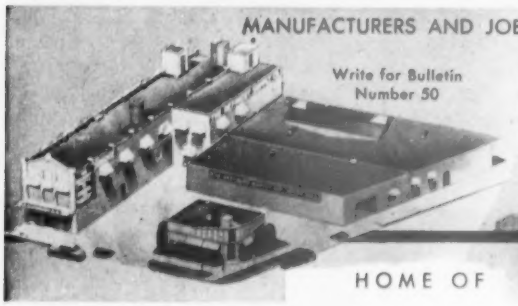
When the refining company, a wholly owned subsidiary of Bell Oil & Gas Co., acquired the refinery in 1938, its output was 2,500 bbl. per day.

Dr. I. Arthur Anson, president of the refining company and a vice president of the parent firm, said the Dubbs thermal cracking unit at the refinery will be converted to a cycle-oil operation.

Refining Briefs

TORRANCE, Calif. — General Petroleum Corp.'s 125,000-bbl. refinery here has won the American Petroleum Institute's "million/hour" safety award. The refinery's workers have completed 1,284,553 man hours without a disabling injury.

NEW YORK.—The American Petroleum Institute has published the fourth volume of its Manual on Disposal of Refinery Wastes. Entitled "Sampling and Analysis of Waste Water," it discusses the latest procedures for dealing with effluent waters from refinery operations. Also, the new publication brings up to date the preceding three volumes on pollution of the country's air and waters. Copies may be obtained for $5 from J. A. McNally, A.P.I., 50 West Fiftieth Street, New York 20, N. Y.



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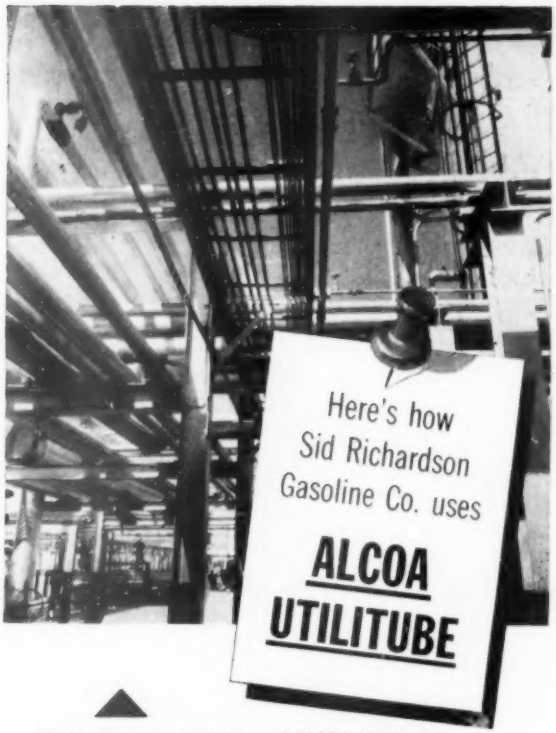

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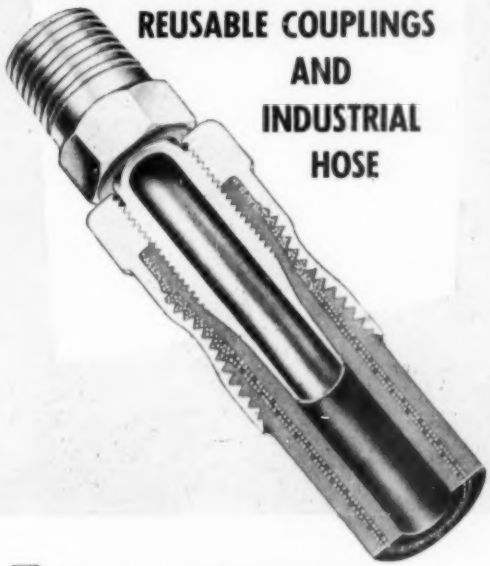

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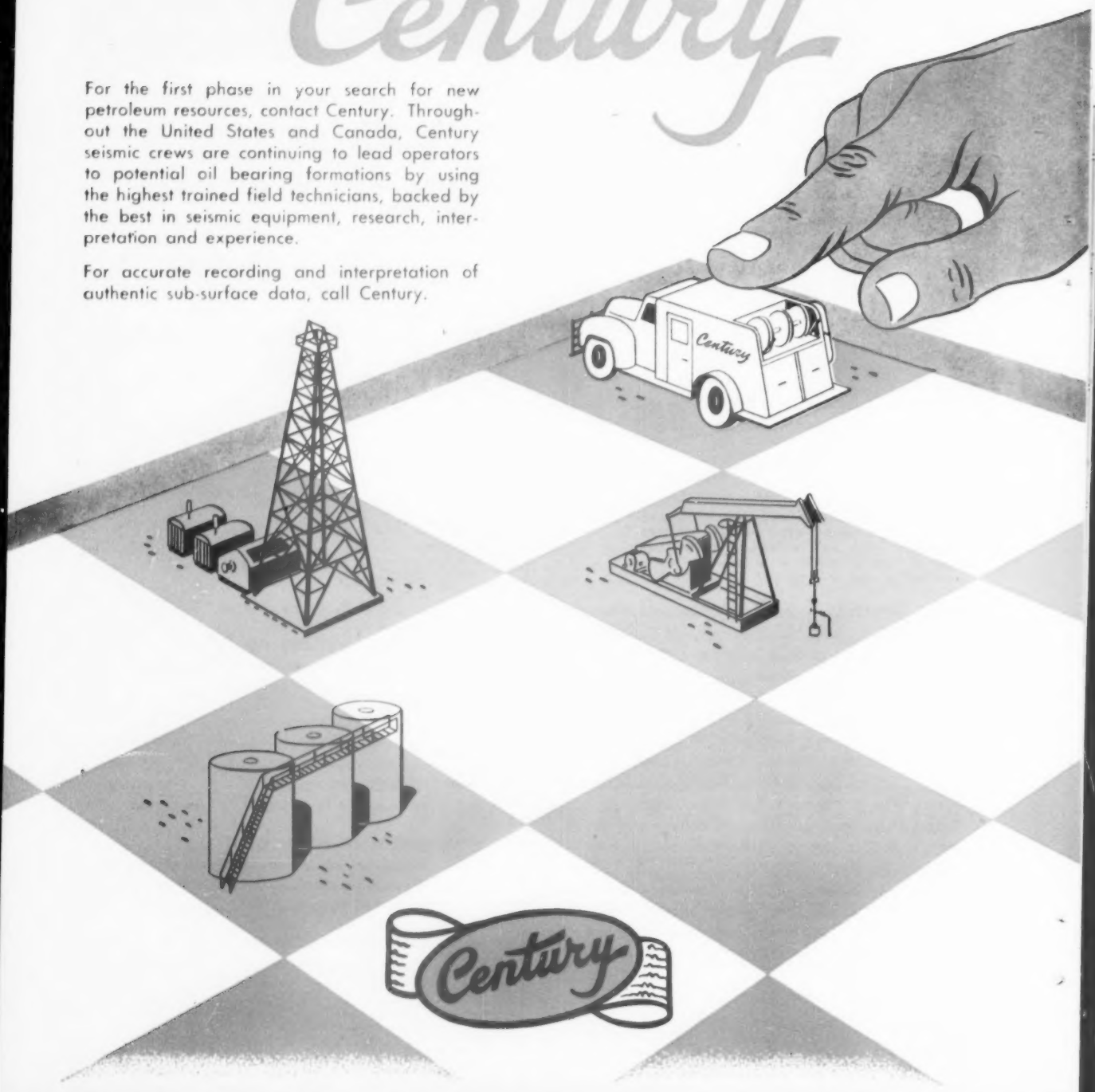

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EXPLORATION

Will the Arkansas Valley Yield Oil?

by Philip C. Ingalls

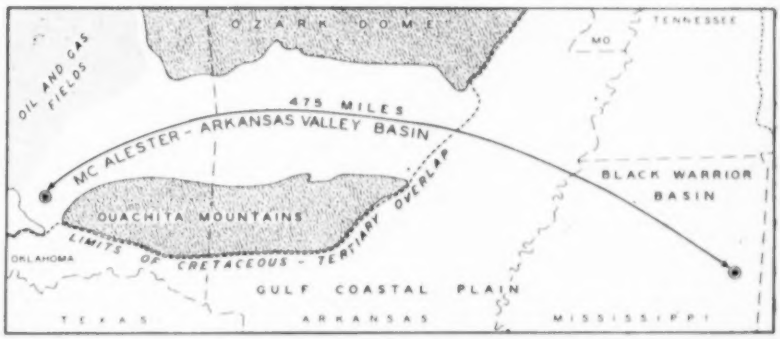
OIL production has been developed in early Paleozoic rocks at each end of the McAlester-Arkansas Valley basin—in Coal County, Oklahoma, and in Monroe County, Mississippi. But, to date only gas has been found between these two areas located 475 miles apart in a sedimentary unit roughly 80 miles wide.

Oil production at the eastern limit of this prism of sedimentaries is at Magnolia Petroleum Co. 1-A Snow. This recent Knox dolomite (Cambro-Ordovician) discovery is in the Black Warrior basin of Mississippi and Alabama, the elbow between the east-west-trending McAlester - Arkansas Valley basin and the roughly north-south-trending Appalachian basin. Magnolia's discovery well is now flowing about 40 bbl. of oil plus 10 per cent of salt water daily on a 10/64-in. choke from perforations at 4,753-56 ft.

In Coal County, at the western limit of this long, narrow sedimentary unit, production has been found in Ordovician rocks. During the past 2 years substantial oil and gas-distillate production has been developed in Simpson sands at East Oconee and Northwest Tupelo fields. The most recent discovery in this badly faulted area is Twin Oil Corp. 1 Cody, which flowed oil at the rate of 500 bbl. daily through chokes from the Simpson-Oil Creek sand at 6,882-92 ft. This discovery is a deeper-pool test in Centrahoma field, an insignificant producer from Pennsylvanian sands.

Dry gas has been found and developed throughout the McAlester basin and in the western end of the Arkansas Valley portion of the unit, chiefly in Pennsylvanian sands. It has been convincingly demonstrated that oil in the Atoka and younger Pennsylvanian rocks is restricted to shelf areas north and west of the McAlester basin, but what may be found in the deeper rocks within the basin proper is still not known. The potentialities of the pre-Atoka rocks remain to be determined, not only in Oklahoma, but in the Arkansas Valley basin and its eastward extension into Northwest Mississippi.

More than 20 years ago when the McAlester basin was being actively prospected, only a few wells were dug deep enough to check the pre-Atoka rocks. Those wells found the older rocks tight and silicified. The entire area was given a black eye. Today this area is being studied again. It is recognized that a few deep wells were not likely to have come up with a representative section for such an extensive basin. Furthermore, the fact that some formations of Pennsylvanian and Mississippian age in the Ozark uplift region give off the odor of petroleum when freshly fractured cannot be overlooked as an indication of oil in the area.



Sketch of the sedimentary unit between Coal County, Oklahoma, and Monroe County, Mississippi, which has yet to produce oil.

Somewhere across the width of the sedimentary unit, or possibly beneath the northward - thrust Ouachitas in places, there is a change in the facies of the pre-Atoka rocks. In the Ouachitas these rocks are continental and near-shore clastics, but in the Ozark uplift area they are marine limestones, dolomites, and shales. The Cambrian and Ordovician rocks, so far as is known, do not materially change in facies throughout the length of the long basin. It is in these rocks that oil production in the unit has been established.

Indications are that a sufficient volume of stratigraphically deep drilling between the two extremities of the greater Arkansas Valley basin can be expected to find sizable oil reservoirs.

References

"Shelf Principle of Oil Origin, Migration, and Accumulation," by T. E. Weirich, A.A.P.G. Bulletin, August 1953.

"Correlation of Pre-Atoka Rocks in the Arkansas Valley," by John C. Maher and Robert J. Lantz, U.S.G.S. Chart OC-51.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

OKLAHOMA . . . An important wildcat in northwestern Oklahoma's Woods County has tested gas-distillate pay in the Simpson dolomite and oil and gas in the Simpson sand. Recovery on the latest drill-stem test at 5,882-90 ft. in the Simpson sand was 1,550 ft. of 40.6°-gravity oil. Up the hole at 5,862-75 ft. in the Simpson dolomite, the strike flowed gas at the rate of 9,000 M.c.f. per day and recovery was 1½ ft. of distillate.

UTAH . . . Gulf Oil Corp. recovered 1,455 ft. of 27°-gravity oil in a 4-hour test of the zone 6,863-7,008 ft. at 1 Brennan Bottom, C NE SE 13-7s-26e, Uintah County.

NORTH DAKOTA . . . The Heath, youngest formation of the Mississippian-Big Snowy group, is an indicated new pay for North Dakota's portion of the Williston basin. Amerada Petroleum Corp. 1 Logan, northwest offset to the 1 May, indicated Madison strike in the Fryburg area of Billings County, recovered more than 1,200 ft. of black oil on drill-stem test at 8,204-44 ft. *(See news section).*

Wildcat Completions, August 1953

	Total	Oil	Gas	Dry	Footage	1953 Total comp.	1953 Cum. (1,000 ft.)	1952 Total comp.	1952 Cum. (1,000 ft.)
Kansas	75	7	5	63	283,196	612	2,304	586	2,288
Oklahoma	68	11	4	53	317,744	536	2,316	511	2,391
Texas	429	74	16	339	2,166,431	3,584	17,519	3,242	15,545
North Central	174	35	3	136	621,672	1,468	5,228	1,437	4,873
West	79	13	2	64	535,827	577	3,431	580	3,398
Panhandle	1	0	0	1	1,200	19	99	44	290
East	18	1	0	17	106,501	202	1,007	160	890
Gulf Coast	66	11	5	50	477,234	604	4,328	467	3,546
Southwest	91	14	6	71	423,997	714	3,426	554	2,548
Louisiana	46	11	3	32	424,515	326	2,906	257	2,256
North	20	2	1	17	138,026	101	599	112	658
South	26	9	2	15	286,489	225	2,307	145	1,598
Mississippi	15	3	1	11	103,101	139	989	126	925
Arkansas	11	3	0	8	41,489	83	290	58	252
Nebraska	11	1	0	10	51,632	109	554	106	437
Rocky Mountain	88	11	2	75	485,016	441	2,504	299	1,596
Dakota	12	0	0	12	61,057	56	320	24	160
New Mexico	18	3	0	15	137,838	103	691	107	693
California	61	9	2	50	280,987	436	2,157	384	1,745
Tri-States	87	2	0	85	170,029	649	1,284	863	1,805
Others	49	1	4	44	170,033	319	1,081	357	1,027
Total August 1953	970	136	37	797	4,693,068	7,393	34,915	6,920	31,120
Total July 1953	1,114	163	39	912	5,339,978				
Cumulative 1953	7,393	1,073	269	6,051	34,914,824	7,393	34,915		
Cumulative 1952	6,920	1,031	177	5,712	31,120,303			6,920	31,120

August Wildcat Completions Drop 13 Per Cent

by John C. McCaslin

THE August wildcat completions dropped about 13 per cent from the previous month's record high. Cumulative wildcat completions for the year stand at 7,393, up 6 per cent over 1952. New oil discoveries are at an even keel with 1952, but new gas pools and dry exploratory wells are up considerably over last year. Wildcat footage is up 12 per cent over the previous year.

Only four areas reported gains in wildcat completions in August. The biggest increase was in the Rocky Mountain area, up 23 to 88. Louisiana, New Mexico, and California all reported slight gains over the previous month. The biggest decrease in completions was in Texas. Despite the slump in wildcat completions, late summer saw significant developments in Mississippi and Oklahoma. In California the world's depth record was established at Ohio Oil Co. 72-4 K.C.L.-A, Paloma field, Kern County. The deep hole is nearing 20,800 ft. in the Miocene. The former record was Superior 1 Unit in Sublette County, Wyoming, which was dry in the Dakota at 20,521 ft., total depth.

Mississippi . . . Magnolia Petroleum Co. is testing at what appears to be the first oil producer in the Black Warrior basin of northeastern Mississippi and northwestern Alabama at 1-A Snow, a rank Monroe County test.

Commercial production is indicated in the Knox dolomite of Lower Ordovician-Upper Cambrian age, which is the approximate equivalent of Texas' Ellenburger and the Arbuckle of Oklahoma and Kansas. The Knox dolomite covers an extensive area of the Southeast. The Magnolia discovery is the first indicated commercial production from the Knox, although there is some Knox oil found in North Central Tennessee. The well is still testing after flowing initially at the rate of 29.3 bbl. of 35°-gravity oil per hour through 17/32-in. choke after acidization. Since original tests the flow and pressures steadily declined and the water cut was increasing.

Northwestern Oklahoma . . . Developments on the northern shelf of the Anadarko basin and in the Oklahoma Panhandle highlighted Mid-Continent drilling activity.

A Simpson sand oil discovery in Grant County in northern Oklahoma has given encouragement for further exploitation of the potentialities of the Ordovician-Simpson sands on the northern basin shelf. Union Oil Co. of California and Sun Oil Co. 1 Simpson, NE NE SE 29-29n-6w, flowed 311 bbl. of 42°-gravity oil per day on ½-in. choke on its first 24-hour production test. The new discovery is on a seismic-located structure, 15 miles southwest of the nearest Simpson production in Caldwell field, Kansas, and about 25 miles northwest of the nearest Oklahoma Simpson production at East Pond Creek and Rich Valley fields. A north offset to the strike is under way.

First oil production in Texas County in the Oklahoma Panhandle was established at United Producing Co. 1 Kelly, C SE NE 2-4n-10eCM. Swabbing netted 84 bbl. of 37°-gravity oil per day from Morrow sand perforations. The significant discovery lies 4 miles east of Cimarron County's new Sturgis Keyes sand (lower Morrow) gas area, and about 8 miles west of nearest Hugoton production.

This first Texas County oil strike is in an area of intense interest. Nearby are located the two most active gas-development areas in the Mid-Continent region, Kansas' Greenwood pool in Morton County, and Cimarron's Sturgis Keyes sand gas pool.

Just east of the vast Hugoton gas field in Seward County, Kansas, J. M. Huber et al. gaged 140,865 M.c.f. of gas per day on open-flow tests from the Morrow sand at a stepout ½ mile north of Liberal-Light pool. Lansekan Co., Inc. 1 Wood, a 2-mile extension northeast of Liberal-Light pool, was completed for a potential of 1,082 bbl. of oil and 3,424 M.c.f. of gas per day. Oil production is from the Lansing lime and the gas from the Morrow sand.

August Completions Fall 10 Per Cent

by John C. McCaslin

TOTAL completions in the United States in August showed a 10 per cent decline from the previous month's record high. Cumulative completions for 1953 stand at 32,071, up 2 per cent over the previous year. Despite a slow start at the beginning of this year, monthly completions have steadily increased since the middle of June, promising that 1953 will set new records for the industry.

Only six areas reported increases over July totals. Completions in Colorado jumped about 80 per cent over the previous month, setting a new high in that state for the year. The significance of Colorado's Little Beaver field in the Denver-Julesburg basin becomes more and more apparent each month as completions in that area continue to climb. Drilling in all Rocky Mountain states is hitting new highs this year. Drilling activity in the area reaches its peak in late summer and early autumn. One of Wyoming's most active areas this year is Weston County in the Powder River basin of the eastern part of the state west of the Black Hills uplift.

Total completions in Oklahoma are setting new all-time highs this year, up 24 per cent over 1952. The most active development area in the state at present is Lincoln County's Kendrick pools. Operators are rapidly expanding the Oswego lime reservoir north and northwest of the town of Kendrick. Logan County's Southwest Navina pool is another steadily expanding area. Garvin County's Northeast Purdy Springer sand area has been one of the state's high-interest spots this year. There are six active operations in the field currently. The pool produces from both the Springer and Hart sands. This new Springer area is rapidly taking on the importance of another Golden Trend. Continued development of Cimarron County's new Keyes sand Sturgis gas area highlights Panhandle interest.

Development work was the keynote in West Texas during the month, with Andrews County continuing to hold a heavy lead. Devonian and Ellenburger extension wells were added throughout the new fields in the Magutex area. In Ector County, Texas Gulf Producing Co. 4 Headlee became the first Devonian completion for the field. On production tests the well flowed about 20 bbl. per hour, comparable to some of the Ellenburger wells. Other wells in the field have indicated production in the Devonian.

SUMMARY OF COMPLETIONS, AUGUST 1953

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	56	28	0	28	56	0	0	0	0	0	86,400	100
Pennsylvania	177	68	34	75	140	13	22	2	0	0	266,795	280
West Virginia	66	6	44	16	37	25	4	0	0	0	181,733	183
Ohio	90	37	11	42	50	39	1	0	0	0	183,890	181
Kentucky	108	35	17	56	83	25	0	0	0	0	208,285	100
Illinois	167	73	1	93	69	98	0	0	0	0	407,296	350
Indiana	120	37	1	82	108	12	0	0	0	0	191,400	160
Michigan	68	27	2	39	37	28	3	0	0	0	166,430	115
Kansas	378	166	35	177	43	326	9	0	0	0	1,286,087	306
Nebraska	29	11	0	18	14	15	0	0	0	0	148,150	35
Oklahoma	621	357	39	225	218	296	75	19	13	0	2,095,088	725
Texas	1,326	726	82	518	291	464	383	149	25	14	6,258,163	1,112
N. Central (7-B & 9)	504	290	6	208	196	196	111	1	0	0	1,724,383	282
West (Dist. 7-C & 8)	303	200	5	98	27	123	93	35	13	12	1,673,914	314
Panhandle (Dist. 10)	63	31	26	6	15	46	1	1	0	0	203,068	79
East (Dist. 5 & 6)	54	18	6	30	1	14	34	5	0	0	314,717	98
Gulf Coast (Dist. 2 & 3)	175	78	17	80	10	33	51	68	11	2	1,174,551	201
Southwest (Dist. 1 & 4)	227	109	22	96	42	52	93	39	1	0	1,167,530	138
Louisiana	232	136	19	77	57	27	25	57	52	14	1,596,129	259
North	113	64	11	38	57	19	17	14	6	0	441,866	163
South	119	72	8	39	0	8	8	43	46	14	1,154,263	196
Arkansas	60	35	0	25	8	39	10	3	0	0	230,785	46
Mississippi	27	10	2	15	0	3	13	9	2	0	193,947	36
Ala.-Ga.-Fla.	13	1	0	12	1	2	10	0	0	0	71,923	16
Montana	30	18	1	11	12	11	0	5	2	0	148,067	80
Wyoming	91	64	2	25	11	32	37	7	4	0	478,720	235
Colorado	115	49	6	60	5	19	82	9	0	0	628,686	100
Utah	6	0	2	4	1	3	1	1	0	0	27,837	25
New Mexico	154	65	62	27	27	38	44	23	11	11	919,878	245
California	224	160	8	56	55	90	45	14	16	4	1,023,088	257
North Dakota	27	17	0	10	0	7	1	19	0	0	195,449	40
Miscellaneous	§17	2	2	13	11	3	1	2	0	0	45,393	¶25
Total August 1953	4,202	†2,128	370	*1,704	1,334	1,615	766	319	125	43	17,039,619	‡5,011
Total July 1953	4,686	2,468	349	1,869	1,446	1,936	781	325	140	38	18,880,874	5,513
Cumulative 1953	32,071	16,574	2,542	12,955	9,675	13,238	5,611	2,342	922	283	130,623,519	
Cumulative 1952	31,277	16,536	2,152	12,589	9,530	12,506	5,619	2,447	945	230	128,834,550	
Western Canada	229	122	23	84	33	128	65	2	1	0	916,787	
Alberta	135	76	19	40	19	59	54	2	1	0	577,098	
Saskatchewan	75	35	0	40	9	57	9	0	0	0	278,435	
Manitoba	12	11	0	1	5	7	0	0	0	0	30,184	
N.W.T.-British Columia	7	0	4	3	0	5	2	0	0	0	31,070	

*Incl. 126 service wells: N. Y. 28, Pa. 68, Kans. 3, Okla. 12, Ohio 11, N. Tex. 3, W. Tex. 1. †Incl. 44 condensate wells: Okla. 9, Panhandle 1, Tex. Gulf Coast 9, S.W. Tex. 10, N. La. 1, S. La. 13, Miss. 1. ‡Incl. all wells rigged up and/or drilling at month end. §Incl. Idaho 1 dry, 458 ft., S. D. 4 dry, 25,727 ft., Mo. 2 oil, 8 dry, 11,792 ft., and Md. 2 gas, 7,416 ft. ¶Incl. Idaho-Ariz.-Nev. 3, S. D. 5, Mo. 15, Md. 2.

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CANADA

Light Oil Found at West Drumheller Field

Light gravity crude oil has been discovered by Canadian Oil Co. at a field development driller in West Drumheller D2 oil field in southern Alberta, 60 miles northeast of Calgary.

The discovery well, which is in an oil field that had previously only produced oil from the higher D2 Devonian zone, flowed oil at rate of 89 bbl. hourly during drill-stem test in the top of D3. Thus, West Drumheller is now assured of dual zone production—at least in one sector of the field.

The new strike was made at Gulf 12-1, West Drumheller, LSD 12, 1-30-21w4, in the approximate north central sector of the field, surrounded by D2 oil producers. D3 reef was entered at 5,645 ft., or 2,955 ft. subsea, and discovery drill-stem test was run from 5,642-50 ft. for 105 minutes. Natural gas flowed to the surface in 4 minutes and oil flowed in 11 minutes, at rate of 89 bbl. hourly. Only fluid recovery was clean 36½°, no water. Coring and testing is being continued.

The Gulf 12-1 well is believed to be the third venture at West Drumheller to be taken down as a test of D3 prospects. A Gulf venture about ½ mile to the west of the new discovery, found D3 reef at an elevation of 3,010 ft., too low for production, while the other D3 test, New Superior et al 4-36 Drumheller, about 1½ miles to the south, encountered the reef at 3,040 ft., also too low for oil yield.

Saskatchewan . . . A well in the central west sector of Saskatchewan that was being drilled in a natural gas development program has discovered light gravity crude oil. This Viking sand oil strike was made at a gas test well being drilled by the team of Imperial Oil, Ltd., Royalite Oil Co., Ltd., and Canada Southern Oils, Ltd., in the Smiley area, 18 miles northwest of Kindersley and 25 miles east of the Alberta border. It lies 1½ miles from gas wells in the area, and is about 6 miles west of Coleville heavy gravity oil field.

The discovery well is Imperial 7-15V Smiley, LSD 7, 15-31-25w3. The Viking was entered at 2,309 ft., and crew has indicated about 20 ft. of water-free oil zone at the site. Drill-stem tests in that horizon gave up 32°-gravity clean oil, in volumes ranging from 210 ft. to 390 ft. during 1 hour tests. Well is being deepened.

Manitoba . . . Another light gravity oil discovery has been recorded in southwestern Manitoba by The California Standard Co. This new strike, in the Whitewater Lake area, 44 miles south-southwest of Brandon and 15 miles north of the North Dakota border, boosts this year's Manitoba discovery score to two. During July McIvor and associates discovered oil at a wildcat in the Virden area, about 8 miles northeast of Daly pool.

The Cal-Standard 12-16 Whitewater wildcat lies on a 160-acre farmout from Canadian Superior Oil of California, Ltd., and is located in LSD 12, 16-3-21w1, 28 miles northeast of the Cal-Standard Waskada oil strike.

Like the previous oil discoveries in Manitoba, Whitewater found its crude in the Mississippian limestone, which was contacted at 2,515 ft., or 851 ft. subsea. On the basis of drill-stem test results this new find has ben assured of 19 ft. of water-free oil zone. Gravity of the oil is around 34°. Coring and testing is proceding.

Alberta . . . Cal-Standard chalked up another oil discovery this week, at a wildcat in the

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East Acheson area of Alberta, 3 miles west of Edmonton and 2¼ miles east of the Acheson Devonian oil field.

This new 35½°-gravity oil strike, which indicated 15 to 18 ft. of oil pay zone above the water table, is Cal Standard 7-6 East Acheson, LSD 7, 6-53-25w4. Oil came from the basal quartz section of the Cretaceous, which was entered at 3,972 ft., or 1,687 ft. subsea. Drill-stem tests in that formation gave up oil recoveries ranging as high as 5,000 ft., with latter test, at bottom 3,991 ft., yielding some formation water in addition to oil.

EASTERN CANADA

Gaspe . . . Continental Oil Co.'s deep test 1, on the Galt Brook Dome, is below 3,158 ft. making gas and oil from 2,794-99 ft. Oil, in small quantities, is a Pennsylvania-type green paraffin base product. Formation dips steeply and is highly fractured or creviced, necessitating frequent shooting. Asphalt Base 1 is below 1,560 ft. with black oil from 1,196-1,202 ft. and will likely test for commercial production. The 1 Tar Point continues to make gas from 7,069 ft. and is preparing to run and set casing. Quebec Oil 2 at 6,000 ft. is temporarily capped, and machinery has been moved to another location.

OKLAHOMA

Simpson Gas-Distillate Found in Rank Woods Test

A rank wildcat on the northern shelf of the Anadarko basin in Woods County, northwestern Oklahoma, has tested gas-distillate pay in the Simpson dolomite.

Champlin Refining Co. 1 Dyer, NE NE SW 17-29n-17w, flowed gas in 2 minutes on drill-stem test at 5,830-55 ft., open 90 minutes. The wet gas was gaged at the end of the first hour at 7,120 M.c.f. per day. Later the gas volume decreased to 5,180 M.c.f. at the test's end. A few gallons of distillate were recovered.

Previous to the Simpson test a drill-stem test in the Viola flowed gas in 3 minutes and was gaged at 734 M.c.f. per day. Recovery was 75 ft. of heavily gas-cut mud and 25 ft. of heavily gas and distillate-cut mud. The Viola test was made at 5,614-35., open 2 hours and 32 minutes. Drilling has resumed at the important wildcat, which is 60 miles from Ringwood field in Major County, Oklahoma, nearest production.

A drill-stem test at 5,882-90 ft., in the Simpson sand, open 55 minutes, flowed gas in 8½ minutes, and oil in 40 minutes. No gage was taken on either gas or oil. Recovery was 1,550 ft. of 40.6°-gravity oil and 285 ft. of salt water. Flow pressure ranged from 560 to 820 psi., and 20-minute shut-in pressure was 2,070 psi. A section of Simpson sand at 5,990-6,000 ft. had a slight odor. Another test was made at 5,983-6,000 ft., open 1 hour, but only 10 ft. of mud with no pressures was recovered. Operator is drilling ahead.

A drill-stem test in the Simpson dolomite at 5,862-75 ft., open 1 hour, flowed gas in 1½ minutes at the rate of 9,000 M.c.f. per day. Also recovered was 1½ ft. of distillate. Flow pressure ranged from 2,090 to 2,140 psi. Twenty-minute shut-in pressure was 2,225 psi.

Arrow points to significant Simpson strike in rank Woods County. Nearest production is Aetna field in Barber County, Kansas, 12 miles northeast.

Springer Sand Pay Proved at Carter Test

Gulf Oil Corp. has proved gas-distillate pay in the Springer sand at their Carter County wildcat, the 1 Riner, SW SW SW 32-5s-2e. Recovery on a drill-stem test at 4,893-4,911 ft. was 10 ft. of distillate. The well flowed gas in 30 seconds at the estimated rate of 5,115 M.c.f. per day. The volume of gas decreased to 3,770 M.c.f.

Good Pay Zones Seen At Garfield Pool Well

Two good pay zones have been tested at Mercury Drilling Co. 4 Cogswell heirs, NE SW NW 5-23n-4w, Northeast Prairie Valley pool well in Garfield County, northern Oklahoma. A drill-stem test in the Misener sand at 5,944-83 ft. flowed gas in 6 minutes at the estimated rate of 880 M.c.f. per day and flowed oil in 62 minutes at the estimated rate of 50 to 60 bbl. per hour. A drill-stem test in the Marshall sand at 6,091-6,106 ft. flowed gas in 6 minutes at the estimated rate of 960 M.c.f. per day and flowed oil in 41 minutes at the estimated rate of 21 bbl. per hour. Gravity of the oil is 42°. Northeast Prairie Valley pool also has second Wilcox sand and Mississippi lime production.

Committee Names New Pools

Eleven new pools in Oklahoma were recently named by the Oklahoma Nomenclature Committee of the Mid-Continent Oil & Gas Association.

One of the most significant new pools in the state in recent weeks is North Jarvis in Grant County, opened by Union Oil Co. of California and Sun Oil Co. at 1 Simpson, NE NE SE 29-29n-6w. Pure Oil Co. opened East Noble pool at 1 Hobaugh, SE SW SW 30-8n-1w, Cleveland County. In Creek County Roy G. Woods 1 Moore, NW NE NE 30-14n-9e, opens Southeast Iron Post pool. Garfield County's new pool is Southwest Hayward, opened by Cities Service Oil Co. at 1 Lewis "B," C NW NE 32-21n-3w. The Texas Co. 2 Frost, SW NW NW 18-12n-3e, Lincoln County, opens Southwest Mammoth.

Lincoln County's new Southeast Hardscrabble pool was opened by Deep Rock Oil Corp. at 1 Rowan "A," SE SE SE 9-15n-4e. Carter Oil Co. 1 Schaffer heirs, SW NW SW 21-22n-2w. Noble County, opens West Polo pool. Stillwater Airport is a new pool in Payne County at S. C. Yingling Oil Operations 1 Swart, NW NE NE 32-20n-2e. In Seminole County The Texas Co. opened Northwest Wetley pool at 1 Damron, NW NW NE 14-5n-5e. Schermerhorn Oil Corp. 1 Ryan, SE SW NW 24-1n-4w, Stephens County, opens North Sholem Alechem pool. Huffman & Malloy 1 Hanza, NW SW SE 33-8n-16w, Washita County, opens Northwest Gotebo pool.

Closing of Extension Link Area Seen at East Payson

The extension area just west of the north end of Lincoln County's prolific East Payson pool has indications of being closed.

W. C. McBride 1 Berry, NE NE NW 35-13n-4e, is testing, and 1 Covey-Newman unit "B," 3, SW NW NE 35, is drilling at 3,890 ft. Skinner sand pay was extended in the pool in August at a well in NE SW SW 26. The well was completed for 192 bbl. of oil per day. McBride is completing 1 Morgan R. Covey heirs, SW SE SW 26. The well swabbed 10 bbl. per hour after fracture treatment. C. L. McMahon is drilling at 2 Allenbaugh, SW SW SE 26 in this linking area.

East Payson pool was opened more than a year ago and has undergone a rapid development program. The development of this pool coupled with the prolific Kendrick pool activity has highlighted Oklahoma drilling this year, making Lincoln County head the list in important drilling.

More Good Pay Section Found at Garvin Strike

Magnolia Petroleum Co. 1 Allison, NW SW NW 22-4n-2w, Garvin County discovery well, has tested excellent pay section. A test at 6,522-59 ft., open 1 hour and 16 minutes, flowed gas in 4 minutes, oil in 8 minutes. The well flowed 105 bbl. of oil in 1 hour on 32/64-in. choke. Gas-oil ratio was 1,070:1. The gravity of the oil is 30°. Recovery on the test was 5,600 ft. of oil. Previous tests in the Bromide sand discovery flowed 27 bbl. per hour at 6,432-47 ft., and 20 bbl. per hour at 6,422-32 ft. At 6,494-6,519 ft. the discovery flowed 46 bbl. of oil per hour.

Thick Section of Simpson Pay Found at Kingman Test

The Texas Co. found a thick Simpson dolomite and sand pay at a rank wildcat in eastern Kingman County. The 1 Jake Grabor, SE NE SW 30-29s-5w, 9 miles southeast of Basil pool, flowed gas and oil on three tests of the Simpson dolomite and Simpson sand.

Gas showed at the surface in 10 minutes and the well flowed oil in 1 hour on a test at 4,460-75 ft. in the dolomite. A test at 4,474-82 ft. flowed gas in 5 minutes and oil in 12 minutes. The third test at 4,482-93 ft. flowed gas in 8 minutes and oil in 40 minutes.

This discovery is about 42 miles north of the recent significant Grant County, Oklahoma Simpson strike by Union Oil Co. of California.

New Pools Opened

Sunray Oil Co. and Stickle Drilling Co. have opened a new gas pool in Barton County on the Central Kansas uplift at 1 Converse, NW NE SW 20-20s-15w. The pool discovery well was finaled for 3,700 M.c.f. of gas per day from the Arbuckle.

In Finney County D. R. Lauck Oil Co. opened Damme Northeast pool at 1 Graves, SE NE NE 16-22s-33w. Pump potential at the Mississippi strike was 147 bbl. of oil per day.

GMR Oil Co. opened Green pool in Rice County at 1 Green, NW NE SE 14-19s-6w. Pump potential is 24 bbl. of oil per day.

CALIFORNIA

Cretaceous Test Staked In Fresno County

Cretaceous formations, which produce considerable volumes of dry gas but so far have yielded very little oil in any California area, will be the objective of a wildcat soon to be spudded in the Cantua Creek area, Fresno County. The test will be Helm Co. and H. R. Sumpf 84 Indart, in 32-17s-15e, or about 10 miles north of Coalinga production.

It will be located about 4 miles southwest of Turk anticline, where Richfield Oil Corp. last year completed a 400-bbl., 59°-gravity producer in the Gatchell sand (Eocene) at 9,220-9,331 ft. It is expected that the new test will have to drill below 10,000 ft. of reach Cretaceous rocks. Other operators with acreage in the area include Ohio Oil Co. and Seaboard Oil Co.

Lost Hills Activity Revived

After several months of inactivity, drilling is being revived in the Farnsworth area about 5 miles northwest of Lost Hills field, Kern County. Tide Water Associated Oil Co., which last April opened a new Pliocene sand pool in SW NW 17-25s-20e, has staked 22-8 S.F.&F.L. in NW NW Section 8. Universal Consolidated Oil Co. will drill 18-21 Conoco in Section 21, about 1½ miles southwest of the 2,750-ft. discovery. Efforts of these two operators, and of Superior Oil Co. and General Petroleum Corp., to extend the discovery so far have been failures.

Union Starting New Simi Test

Union Oil Co. was preparing to start a new wildcat on its 30,000-acre Simi fee property and plans drilling two others later this year. The three fields discovered on these Ventura County properties in the past 18 months have a current production of about 10,000 bbl. daily.

The new wildcat will be 23 Simi, in Chivo Canyon about 2½ miles east of the South Tapo Canyon field. Union completed 9 Simi on the east flank of that field as a 132-bbl. producer at a plugged back depth of 2,248 ft. Its nine producers there currently are producing about 3,000 bbl. daily.

APPALACHIAN AREA

WEST VIRGINIA

In Middle Fork district, Randolph County, West Virginia, the largest gas well to be brought in since operations started in this wildcat area was Nollem Oil & Gas Corp. I-A Moore Keppel & Co., Cappadona Tract, resulting in 4,045,000 cu. ft. gas, after blowing open for 15 hours, Bayard sand 1,850 ft., gas 1,860-1,862 ft., TD 1,862 ft. After being shut in for 30 minutes, the rock pressure gaged 630 psi. No pipe line has yet been extended to this field.

OHIO

Frank Lyons et al. 1 C. A. Walleck, Section 16, Wayne Township, Tuscarawas County, a second test in a wildcat area, gaged 1,500,000 cu. ft. in the lower Clinton at 4,495-4,534 ft. Drilling is being continued with the gas volume decreasing, probably because of freezing in.

In Mount Vernon field, Preston Oil Co. S. R. T. Rine, Section 15, Perry Township,

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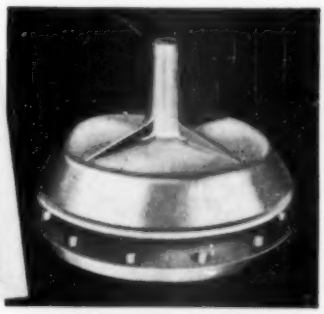

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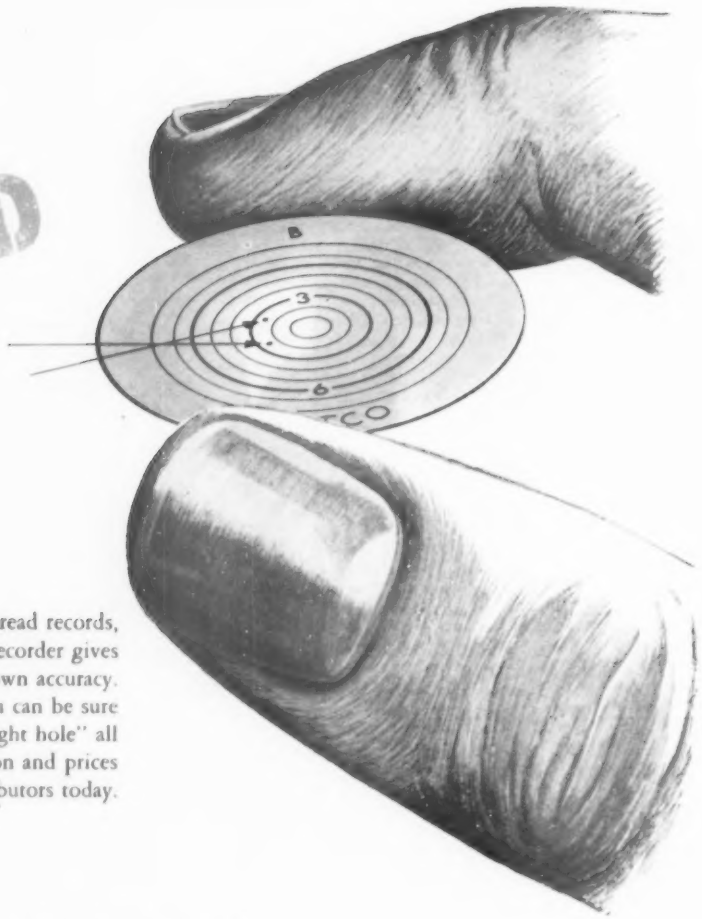

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Coshocton County, showed 7 bbl. natural and 135 bbl. in 18 hours after fracturing. Ray Penick et al. 10 E. Harris, Section 23, Jackson Township, Knox County, made 3 bbl. natural and 100 bbl. in 24 hours after fracturing.

TEXAS

WEST TEXAS

Second Crane Test Recovers Oil

Gulf Oil Corp. 2 Lea, ½-mile southeast offset to its discovery of Lea-Ellenburger pool, found 26 ft. of dolomite with oil shows and developed considerable oil on first test in the Ellenburger.

Core recovery between 8,200-44 ft. was 44 ft., being 18 ft. of shaly dolomite and 26 ft. of finely crystalline dolomite with oil shows. Top of the Ellenburger was picked at 8,218 ft. Elevation at 2 Lea was not reported. No. 1 P. J. Lea found the Ellenburger at 8,132 ft. on elevation of 2,508 ft. Drill-stem test in the second well from 8,210-44 ft. recovered 945 ft. of clean oil and 135 ft. of oil and gas-cut mud with no water. At last report operators had cored 10 ft. more dolomite, bleeding oil, and were drilling ahead.

Meanwhile, Union Oil Co. announced location for a 9,000-ft. wildcat to be 3 miles southeast of the above wells. Operation will be 1 W. Wright in 68-X-CCSD&RGNG Survey.

Midland County . . . Stanolind Oil & Gas Co. 1-AF Midland Farms, northwest of Midland, reported recovery of 450 ft. of oil and 360 ft. of oil-cut mud on a 3-hour drill-stem test in Grayburg limestone at 4,599-4,650 ft. Nearest Permian production is in the Mabee field, 8 miles north.

Pecos County . . . Cities Production Corp. 1-B Payton, ⅝-mile southwest of the firm's Devonian gas-distillate strike in the shallow Payton pool, reported recovery of gas and gas-cut mud with a show of high-gravity oil on drill-stem test betwen 6,813-97 ft. Early reports indicated the section might be Wolfcamp. Recovery in 3 hours was 1,336 ft. of gas-cut mud and 275 ft. of the same with a show of oil. Drilling continued below 6,919 ft.

NORTH TEXAS

Nolan County Discovery Completed

General Crude Oil Co. 1 Ussery, King sand discovery in 310-64-H&TC Survey, south of Nolan, turned in a completion potential of 113 bbl. of oil. Production was through 1 in. choke on perforations at 4,031-81 ft.

Union Oil Co. and B. A. Duffy 1 Cox, west of Lake Trammell Canyon sand pool, but separated by a dry hole, developed a good flow of oil on drill-stem test in Canyon sand. On the test, between 5,244-5,333 ft., gas surfaced in 10 minutes and oil in 12 minutes, flowing an estimated 20 bbl. hourly. Recovery was oil with no water and operators prepared to set casing for completion tests.

Stonewall County . . . A south extension to Old Glory field was in the making at Allen Guiberson and J. D. Tomkins 1 Mrs. Ella Bunnell, Section 1, T. Constable Survey. A 2-hour and 40-minute drill-stem test of the Bend conglomerate from 5,998-6,090 ft. unloaded oil while tubing was being pulled. Operators planned to retest the section and complete

TEXAS GULF COAST

New Producer Confirms Call Area Oil Discovery

Discovery last July of Yegua oil production in what is known as the R. E. (Bob) Smith area, west of the Call field, in Newton County, has been confirmed with completion the past week of the area's second producer.

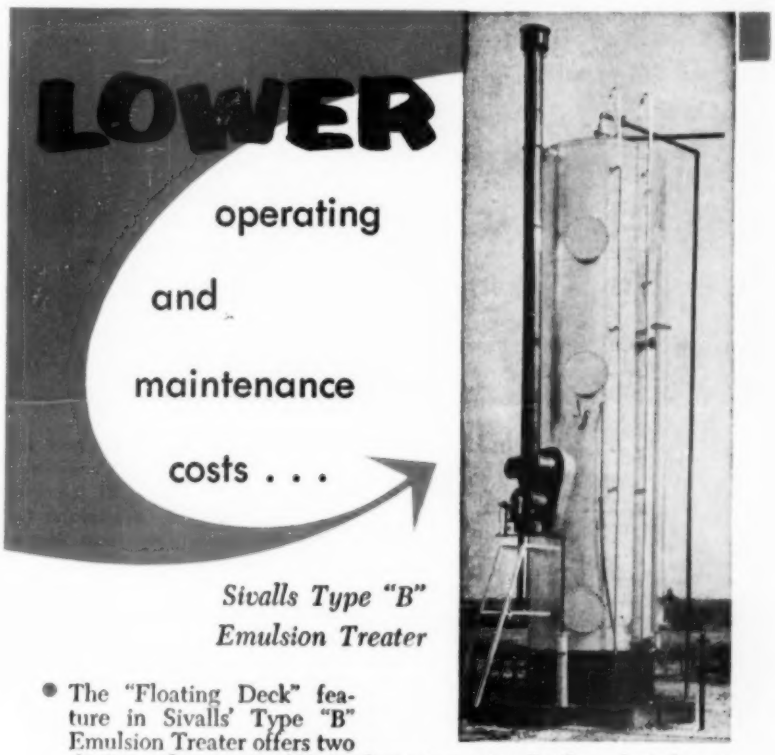
The new well, American Republics Corp. and Houston Oil Co. 2 Hankamer, located approximately 1,200 ft. northeast of the discovery well, flowed at the rate of 173.54 bbl. of 47.7°-gravity oil per day on completion gage through 8/64-in. choke with pressure of 1,500 psi. on the tubing. Producing interval is at 7,348-50 ft. (casing perforations).

Production in the area was opened by Warren Petroleum Corp. and R. E. Smith at their 1 Quinn, which flowed 246.54 bbl. of 49.2°-gravity oil per day through 10/64-in. choke with 1,520-psi. pressure. It has casing perforated at 7,360-65 ft.

Since completion of their discovery well, these operators have drilled a dry hole, 2 Quinn, 1,200 ft. northwest of the initial producer. They now are drilling their third hole, 3 Quinn, 1,200 ft. southwest of the discovery.

New Gas-Condensate Area

Houston Oil Co. and American Republics Corp. have opened a new gas-condensate producing area a mile north of the Olive field, in Hardin County, at its 1-A Sternenberg, completed flowing at the rate of 4,300,000 cu. ft. of gas daily with a gas-con-



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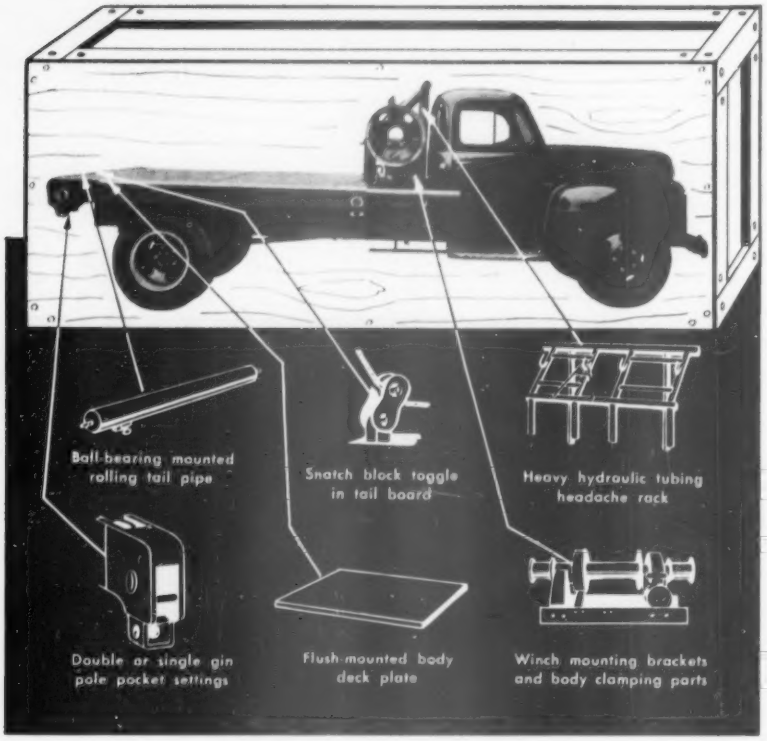
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densate ratio of 22,500 cu. ft. of gas per barrel. Gravity of the condensate is 63.8°. Production is from Yegua sand, open at 7,360-64 ft.

TEXAS GULF COAST

Oil Production Proved in New Refugio County Area

Another producing area, located 3 miles southeast of Refugio and 1 mile west of the south end of the Melon Creek field, in Refugio County, has been opened by Humble Oil & Refining Co. with the completion of its 1-B Mary Ellen O'Connor, flowing 123 bbl. of 36.7°-gravity oil per day from casing perforations at 5,866-76 ft. A north offset, Chicago Corp. 1 Lawrence O'Connor, already is in process of completion to confirm the discovery. Drilling also is under way at another test for the area, this being Humble Oil & Refining Co. 2-B O'Connor, 1,273 ft. southeast of the discovery well. The area has been designated tentatively as the Mary Ellen O'Connor field.

ROCKY MOUNTAIN

COLORADO

New Field, New Pay Discoveries Reported

The prolific Badger Creek area of Adams County has been credited with a new Cretaceous discovery. Sinclair Oil & Gas Co. recovered 1,875 ft. of oil, 90 ft. of heavily oil and gas-cut mud and 10 ft. of muddy water on 1-hour test at 2 Shea, NE NE SW 14-2s-57w. Test was run of the zone 5,265-85 ft. and flowing pressure was 165-600 psi. The well is ¾ of a mile northeast of production in Badger Creek field proper, and about ½ mile west of an earlier failure drilled on the same lease by Sinclair. The operator is reported coring ahead at 5,285 ft.

In Long field, which straddles the Colorado-Nebraska line in northern Weld County, a "D" sand new pay discovery is indicated at Goodall-Trueblood and Western Central Petroleum Co.'s 1 Beard, NE NE NW 26-12n-56w. The wildcat was test in the interval 6,353-88 ft. and recovery in 2 hours was 1,600 ft. of oil and 1,200 ft. of water under flowing pressure of 495-950 psi. The operators are preparing to run casing at total depth of 6,440 ft.

Deep Test Staked In Larimer County

Amerada Petroleum Corp. has made location for 1 State, NW NE SE 16-11n-68w, in Larimer County, west of previous production in the Denver-Julesburg basin. The wildcat will test the Lyons (Permian) sand. It is about 24 miles northwest of production in this formation in the Black Hollow area of Weld County.

Washington County Wildcat Is Apparent Discovery

Vaughey & Vaughey have tested apparently commercial quantities of oil from "D" sand at 1 Alexander, NW NW NE 12-1s-55w, in western Washington County. The wildcat is south of McRae field in southern Morgan County, and east of Little Beaver. Test was run of the interval 4,800-33 ft., and with tool open 2 hours and 57 minutes the re-

covery was 2,520 ft. of oil and 250 ft. of heavily oil-cut mud under flowing pressure of 275-825 psi.

An 8-ft. saturated section of core was recovered from the interval 4,809-17 ft. "J" sand was cored with slight shows reported, but the apparently wet sand was not tested. Total depth of the wildcat is 4,892 ft. and operators are waiting on cement after landing casing at 4,886 ft.

UTAH

Uintah County Wildcats Show Oil on Test

Gulf Oil Corp. recovered 1,455 ft. of 27°-gravity oil on 4-hour drill-stem test from 6,863-7,008 ft. at 1 Brennan Bottom, C NE SE 13-7s-20e, 9 miles southeast of Gusher field. Recovery included, in addition to the oil, 120 ft. of heavily oil-cut mud, and flowing pressure was 600-610 psi. Top of Green River at 3,755 ft. is the only top reported. Several small shows have been reported in zones above the present test, but have consisted of small flows of gas with some oil-cut mud. The well will go to about 8,000 ft. before completion.

East of the Gulf discovery, Carter Oil Co. has recovered additional oil on further testing of 1 Bamberger Unit, C SW NE 11-7s-23e. Test was run at 5,273-86 ft. and tool was open 1 hour. Recovery was 60 ft. of mud and 321 ft. of 30°-gravity oil. A previous test from 4,729-38 ft. recovered 420 ft. of black oil.

WYOMING

Big Horn Basin Deep Test Announced

Anderson-Prichard Oil Corp. has made location for a deep test west of Gulf Oil Corp.'s Phosphoria discovery in the Fourteen Mile area of Washakie County. The operator will drill a 14,200-ft. test on a block of 11,880 acres which is a joint farmout from Continental Oil Co. and Sohio Petroleum Co. The block is located in the south half of 47n-95w, and in the northern edge of 46n-95w. Gulf recently made location for a confirmation northeast of the Fourteen Mile discovery.

West Sussex Extension Flows at High Rate

Walter and Mark Davis, Casper independents, have reported a flow of 108 bbl. of oil per hour on test of 1 Government, NE NE NE 3-42n-80w, Johnson County. The well is about ½ mile northwest of production in the West Sussex unit, operated by Continental Oil Co. Tubing was open 1 hour. Production is from lower Shannon sand, topped at 2,760 ft. A total of 14 ft. of apparently productive sand was reported by the operators.

MONTANA

Wibaux, Fallon Counties To Get Deep Wildcats

Lion Oil Co. has tentatively located an 11,500-ft. Ordovician test in SW NW 29-14n-60w, in Wibaux County. The location is 4 miles west of the North Dakota border, and 3 miles northeast of the town of Wibaux. There has been no previous drilling in this area of the Williston basin, and the wildcat is important to the deeper seismic prospects in eastern Montana. The location is approximately midway between production on the Cedar Creek anticline and Amerada Petroleum's discovery in the Fryburg area of Billings County, North Dakota.

F. R. Anderson, Denver and Los Angeles independent, has made location for 1U Bohle, C NE NE 20-7n-57e, in the Hay area of Fallon County. The rank wildcat is 17 miles west of the Cedar Creek anticline and 18 miles southwest of production in Cabin Creek area. It is on acreage farmed out to Anderson by Shell Oil Co.

Ivanhoe Area Morrison Discovery Completed

The Chicago Corp. and Republic Natural Gas Co. have completed 1 NPRR, SW SE NE 17-11n-31e, Musselshell County for a pump gage of 92 bbl. of oil daily. The well produced from the Morrison zone through

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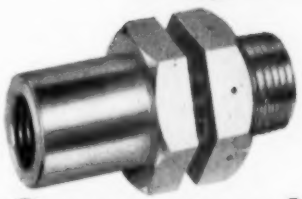
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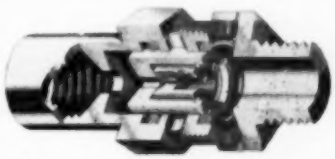
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perforations 2,798-2,805 ft. A confirmation test 2 NPRR, NE NW SE 17-11n-31e, has been abandoned with only slight Morrison shows reported.

NORTH DAKOTA

Amerada to Complete Fryburg Area Discovery

Amerada Petroleum Corp. has plugged back from total depth of 13,325 ft. at 1 May, C NW NE 9-139n-100w in the Fryburg area of Billings County and is preparing for completion in Madison lime. Deeper formations had shows, but none of commercial caliber. The well flowed at the approximate rate of 325 bbl. of oil per day on tests of the Madison at about 9,400 ft.

NEW MEXICO

SOUTHEAST NEW MEXICO

Thick Devonian Section In Lea County Wildcat

Western Natural Gas Co. 1 Millard Eidson, central Lea County wildcat in 35-16s-35e, has established the water table in the Devonian and based on drill-stem tests, the well has an estimated 250 ft. of pay section.

Water was encountered on test between 12,701-12,756 ft. The tool was open 4½ hours which produced a small amount of gas at the surface. After pulling 4,145 ft. of pipe the well unloaded. Recovery was approximately 4,500 ft. of clean, 59° oil and 2,256 ft. of oil and gas-cut sulfur water.

Cities Service Oil Co. 3-AD State, Lea County test in 22-10s-32e, has extended Pennsylvanian production ½ mile north and east. Completion potential was 340 bbl. of oil a day through ½-in. choke from perforations at 8,330-8,560 ft.

Deep well plugged . . . Sun Oil Co. 1 Harper-Federal, Delaware basin test in 26-24s-35e, which has had extensive testing over a long period of time, has been given up. Original total depth was 14,993 ft. Side-tracked hole was drilled to 11,848 ft.

Richardson & Bass 1 Fidel-Federal, another Delaware basin test, will continue testing the Pennsylvanian. Perforations from 11,944-11,971 ft. developed a small amount of gas.

INDIANA

A new pool for central Indiana is indicated at N. E. Marshall and Mike Myers 1 Jess E. Atkinson, NE NE SW 15-24n-9e. Operator has set 5½-in. casing at 1,063 ft. through the Trenton limestone at 1,008-42 ft. Good oil saturation, 25 ft., was cored. The Trenton discovery is located 12 miles east of Marion and 3 miles north of Upland. It is 35 miles from other production.

KENTUCKY

EASTERN KENTUCKY

In Greenup County and 4 miles west of Oldtown, Kentucky, Ohio Gas Co. have a dry hole at their 1 B. F. Warnock wildcat. Operators topped objective Corniferous limestone at 1,150 ft. and drilled to a total depth of 1,247 ft. A hole full of water was had at 1,243 ft. No shows were reported.

In southeastern Morgan County the wild-

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cat drilled by Cantrell and Everman at 1 Edison Legg has been plugged and abandoned at a total depth of 948 ft. in Berea (Mississippian) sand topped at 886 ft. A show of oil in the sand shot into approximately 1 bbl. of oil daily.

MICHIGAN

The first Richfield oil producer in the Franklin Township extension area, Clare County, of Headquarters field Detroit River and Richfield oil pool, was reported to be flowing oil at the rate of 100 to 150 bbl. a day from both zones after a 5,000-gal. acid treatment. The largest portion of the daily average production was believed to be coming from the Richfield. This new producer, which will probably have to be given a rating of a major extension of the Richfield pay, was the E. V. Hilliard 1 Stafford, N½ NW SE 10-20n-3w.

In Cranberry Lake field, Winterfield Township, Clare County, the first shallow Detroit River oil well completion was under test at the Miami Operating Co. and Leonard Drilling Co. 1 State-Winterfield, NW SE SW 2-20n-6w. Most all of the other wells in the pool (with a few Traverse and Dundee exceptions) are completed in the Richfield, but evidence of Detroit River pay was noted at several others. This first completion in this lower zone was tested out dry in the Richfield at 5,143 ft., total depth. The Detroit River pay was said to be showing for an estimated rate of 42 bbl. after well produced 23 bbl. of oil, no water, on a 15½-hour test. The shallower Detroit River pay was perforated at 4,785-89, 4,802-06, and 4,816-22 ft. Well was acidized with a small cleanout shot and was to be reacidized with larger shots, but was unofficially reported to be flowing at the rate of 10 bbl. of oil an hour, restricted, after the first treatment.

First dual zone completion (Detroit River along with established Richfield) in the West Branch field, Ogemaw County, was reported to be pumping at the rate of 30 bbl. of oil and 3 bbl. of water a day after a total of 10,000 gal. of acid to all zones. This first dual well in West Branch was the Gallaher, English & Ehinger 1 Schubert, SE NE NW 19-22n-2e, bottomed out at 3,995 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Aransas County: Arkansas Fuel Oil Corp. 1 State, Tract 4, Puerto Bay. IP 21,500 M.c.f. daily with 17 BC per million cubic feet, open flow, 60.1°, casing perforations 6,792-98 ft. and 6,805-11 ft. TD 7,493 ft. (New pay in Puerto Bay field.)

Atascosa County: H. H. Howell 1 Tom, John Benson Sur. 148, A-72. Dry. TD 3,647 ft.

Thomas Brothers and Gilcrease Oil Co. 1 Boothe, Block 60, Section 1191, LaParita Farms Subd. Dry. TD 1,816 ft.

Bell County: J. P. Carrell 1 Shelley, Jose M. Atocha 4 Lge. Dry. TD 1,115 ft.

Caldwell County: O. W. Killam 1 Cardwell, Cornelius Crenshaw Sur. Dry. TD 1,891 ft.

Dimmit County: Howeth & Mason 2 McLaren, William Votaw Sur. 9, A-734. Dry. TD 4,564 ft.

Duval County: Argo Oil Corp. 20 Bennett, SK & K Sur. 439. Dry. TD 7,402 ft.

Jim Hogg County: Sam Cunningham 2 Benavides, Noriecitos Grant, A-356. Dry. TD 3,498 ft.

Jake L. Hamon and Edwin L. Cox 1 Silver Lakes Ranch, Inc., Survey 300-1, A-223. Dry. TD 3,800 ft.

Jim Wells County: Gorman & DeLange et al 1 Osterloh, I & GN Sur., A-245. Dry. TD 4,344 ft.

R. G. Piper 1 Garza, La Tinaja de Lara Grant, A-36. Dry. TD 5,010 ft.

Kendall County: Magnolia Petroleum Co. 1 Below, B. Ficklin Irrigation Co. Sur. 881, A-87. Dry. TD 6,250 ft.

McMullen County: J. T. De Grazier 1 Quinn, Manuel Costillo Sur. 7, A-167. Dry. TD 7,015 ft.

San Patricio County: Arkansas Fuel Oil Corp. 1 McKamey, SA & MG Sur. 10, A-257. Dry. TD 10,050 ft.

Plymouth Oil Co. 32-A Welder, Section 76, Welder Ranch Subd. Dry. TD 8,890 ft.

H. R. Smith 1 Davis, Section 90, George H. Paul Subd., J. J. Welder Ranch. Dry. TD 5,700 ft.

Starr County: L & W Drilling Co. 1 Wardner, Porcion 84. Dry. TD 4,500 ft.

Travis County: B. R. Floyd 2 Johnson, Pedro Rodriquez Sur. Dry. TD 904 ft.

Webb County: Blanco Oil Co. 1 Villareal, J. M. Garcia 1100 Sur. Dry. TD 2,701 ft.

Jake L. Hamon 1 Villareal, GC & SF Sur. 465. Dry. TD 8,005 ft.

H. R. Smith 5 Semmes-DCRC, Zapata County School Land Lge. 3. Dry. TD 4,242 ft.

Zapata County: Horner & Lowe Enterprises 1-A Benavides, Survey 613. Dry. TD 1,340 ft.

A. M. Lacey 1-A Martinez, N. C. Walter Subd., Blas Maria Sur. Dry. TD 1,167 ft.

Standard Oil Co. of Texas 1 Serapio Velva 15, El Grullo Grant, A-37. Dry. TD 17,737 ft.

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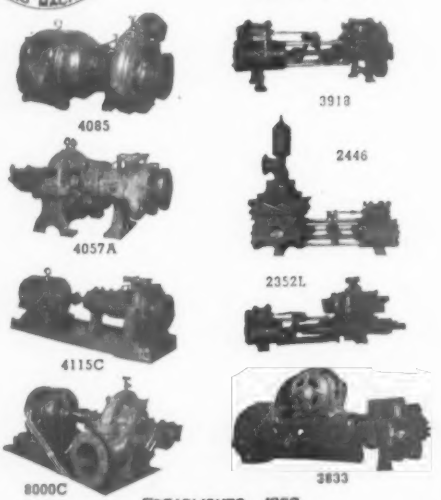

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WILDCAT COMPLETIONS

TEXAS GULF COAST

Calhoun County: Hassie Hunt Trust est. 1 State, Tract 200, Espirity Santo Bay. Dry. TD 6,588 ft.

Lamar Hunt Trust est. 1 State, Tract 59, San Antonio Bay. IP 2,100 M.c.f. daily, 12/64-in., casing perforations 10,532-42 ft. (New field, East St. Charles).

Colorado County: C. N. Housh 1 American Legion et al unit, E. Tumlinson Sur., A-44. IP 240.05 BOPD, 10/64-in., 33°, casing perforations 9,670-78 ft. TD 10,321 ft. (New pay in Cecil Noble field).

Fort Bend County: Lloyd H. Smith 1 Chalupa et al unit, William Laughridge 4 Sur., A-284. Dry. TD 8,600 ft.

Jackson County: George S. Hammonds 1 Robinson, Martha Isaacs Sur., A-287. Dry. TD 4,707 ft.

Live Oak County: Schimmel Drilling Co. et al 1 Essee, James Ingram Sur., A-261. Dry. TD 6,620 ft.

J. M. Vassey 1 Rentfro 2 Atkins, B. B. Atkins Sur. 2. IPP 16.38 BOPD, 28°, casing perforations 3,409-22 ft. TD 3,503 ft.

Orange County: Eastern States Petroleum Co., Inc., and Hurt Oil Co., Ltd., 1 Stark, J. W. Maxey Sur., A-425. Dry. TD 7,994 ft.

Polk County: A. B. Alkek 4 Broman, A. Viesca Lge. IPP 42 BOPD, 31.6°, casing perforations 3,366-75 ft. TD 3,448 ft. (New pay in Goodrich field).

Refugio County: Kelley Brothers 1 Messer, Esteban Lopez Sur. (Bonnie View area). Dry. TD 6,010 ft.

Victoria County: W. H. Cocke and R. H. Goodrich 1 McLachlan, SA&MG Sur. 7, A-318. Dry. TD 865 ft.

Corpus Christi Refining Co. 1 Schustereit, John D. Wright Sur., A-125. Dry. TD 5,003 ft.

EAST TEXAS

Anderson County: Cities Service Oil Co. 1 Carl Riddles, Anderson CSL, A-70. Dry. TD 10,483 ft. in Travis Peak. Elev. 512 ft., Glen Rose 7,650 ft.

L. A. Grelling and C. C. Coulston 1 Peter Bridges, Robert Frost Sur., A-287. Dry. TD 5,740 ft.

Freestone County: Byars & Peveto 1 Riley, J. M. McClanahan Sur., A-416. Dry. TD 4,701 ft.

Wm. D. McBee and Mar-Tex Oil & Gas Co. 1 Settlemyre, Wm. Penman Sur., A-381. Dry. TD 6,358 ft., elev. 300 ft., Woodbine 6,172 ft.

Hunt County: Dilworth S. Hager and B. G. Byars 1 Andrews, J. P. Bowerman Sur. Dry. TD 2,952 ft.

Byars & Peveto et al 1 Zone Bell Adams, Patrick Hays Sur., A-503. Dry. TD 3,400 ft.

V-T Oil Co. 1 John L. Ray, A. S. Skaats Sur. Dry. TD 3,028 ft.

San Augustine County: Lester & Culbertson 1 Childers, C. Chaplin Sur., A-5. Dry. TD 10,031 ft.

Wood County: San Juan Exploration Co. 1 Rushing, R. E. Neill Sur., A-434. Dry. TD 6,652 ft.

WEST CENTRAL TEXAS

Callahan County: J. A. Clemments and Bell Black 1 Mrs. A. C. Scott, C. Cooper Sur. 205 Dry. TD 2,196 ft.

Fresno Oil Co. 1-A Morrissett, 67-14-T&P Dry. TD 2,002 ft.

Harry D. Kahn 1 C. M. Caldwell, 13-5-SPRR. Dry. TD 4,460 ft.

Sheardy A. Lamb 1 Fred Cutburth, Sec. 204, Bartola Garcia Sur. IPP 10 BOPD, pay 2,174 ft. TD 2,200 ft.

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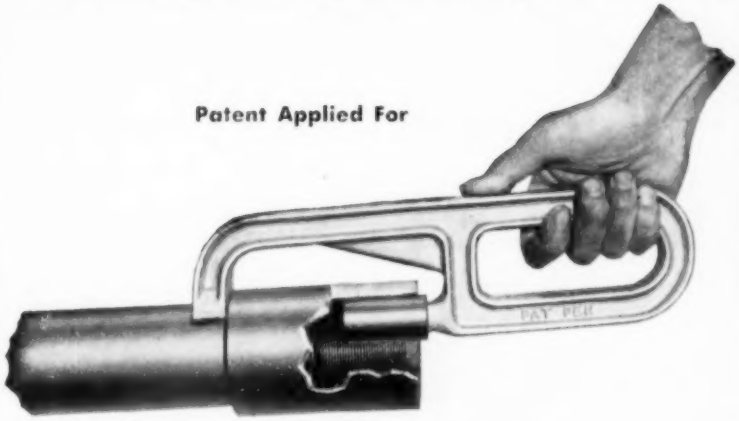

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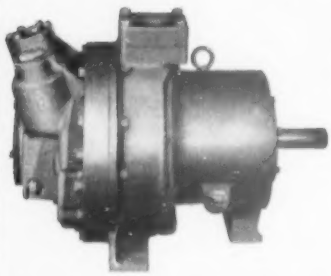

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WILDCAT COMPLETIONS

Trumter Petroleum Corp. 1 Williams, Sec. 68, BOA Sur. Dry. TD 2,170 ft.

Coleman County: The Chicago Corp. 1 McCord, E. Yancey Sur. 158. Dry. TD 3,702 ft.

Sid Katz 1 W. L. Jennings, 22-2-GH&H. Dry. TD 3,170 ft.

Newton Conrod Oil Corp. 2 Dan Smith, Sec. 1, Brooks & Burleson Sur. Dry. TD 4,000 ft.

Wm. J. Weaver 1 Myrtle Strange, Sec. 693, J. F. Thiel Sur. Dry. TD 3,170 ft.

Eastland County: B. G. Joyce 1 F. B. Joyce, Blk. 14, James Jett Sur. Dry. TD 1,205 ft.

Fisher County: Trans-Tex Drilling Co. 1 R. J. Robertson, 185-1-BBB&C. Dry. TD 5,417 ft., elev. 1,782 ft., Strawn limestone 5,348 ft.

Woodson Oil Co. 1 S. E. Knox, 4-318-Gillespie CSL. IPP 162.8 BOPD, 38°, Flippen pay 3,612 ft. TD 6,464 ft., PB 3,800 ft.

Jones County: Bridwell Oil Co. 1 Charles Vasek, Sec. 35, D&DA. Dry. TD 3,600 ft.

W. E. Butler 1 Mrs. Liela Stephens, Blk. 337, McMullen & McGlorin Sur. Dry. TD 5,520 ft., elev. 1,730 ft., Strawn sand 5,198 ft.

J. J. Lynn 3 Chancey, 15-17-T&P. Dry. TD 2,801 ft.

S. B. Roberts 2 Bert Fields, Samuel Andrews Sur. 191. IPP 99.5 BOPD, 39°, pay 1,950 ft. TD 2,135 ft.

Nolan County: C. L. McMahon, Inc. 1 Sliger, 188-64-H&TC. IP 170 BOPD, 12/64-in., 46°, Goens limestone perforated 5,144-48 ft., top pay 5,132 ft. TD 5,793 ft.

Shackelford County: Joe H. Deer 1 C. K. Hash, Sec. 822, TE&L Sur. Dry. TD 826 ft.

Stephens County: Fort Worth Exploration Co. 1 Langford, Sec. 121, H&TB. Dry. TD 2,050 ft.

The Hunter Co. 1 A. Rickles, 8-2-SPRR. IP 121 BOPD, 1/64-in., 44°, pay 3,996 ft. TD 4,553 ft.

Stonewall County: Ohio Oil Co. 1-A Lee Smith, 127-D-H&TC. Dry. TD 5,257 ft.

Taylor County: Gilchrist Drilling Co. 1 John Bull, J. Walker Sur. 456, IP 275 BOPD, 18/64-in., 39°, pay 4,416 ft. TD 4,554 ft.

T. A. Kirk 1 Tom Motz, Sec. 3, W. R. Smith Sur. Dry. TD 6,389 ft, elev. 2,450 ft., Ellenburger 5,956 ft., Cambrian sand 6,360 ft.

Carl Tilden 1-A R. W. Dean, Sec. 461, W. S. Henry Sur. Dry. TD 5,718 ft.

Throckmorton County: Gilchrist Drilling Co. 1 B. B. Gober, Sec. 3, Day Land & Cattle Co. Sur., IP 106 BOPD, 16/64-in., 42°, pay 4,629 ft. TD 4,731 ft.

NORTH TEXAS

Archer County: Wichita Pipe & Supply Co. 1 Decker, Blk. 15, Matthew Doyle Sur. A-221. Dry. TD 2,063 ft.

Baylor County: Merle Gunby 1 Porter, Blk. 136, T&NO RR Sur. Dry. TD 5,414 ft.

Grayson County: The Texas Co. 2 Bush Jones, James Coryell Sur., A-261, IPF 208 BOPD, ¼-in. choke, top pay 6,294 ft. (Extension or new pay in Big Mineral Creek.)

Jack County: Russell Maguire 4 L. B. Skaggs, SA&MG Sur., A-589. IPP 10.12 BOPD, perfs. 2,438-41 ft., 42°, TD 3,450 ft. (Oil discovery.)

W. T. Waggoner Est. et al 1-B Hilburn, R. Parker Sur., A-461. Dry. TD 4,010 ft.

Montague County: Kenneth A. Ellison 1 Molskee, Charles Edward Sur., A-223. Dry. TD 5,490 ft.

Wichita County: Chas. E. Morrison 1 Slaughter, Blk. 19, H&GN Sur., A-143. IPF 150 BO, 3 hours, open tubing, top pay 3,790 ft., 35°. TD 3,798 ft. (Oil discovery.)

Wilbarger County: Wm. L. Snoddy et al 1 Boman, Sec. 5, Blk. 9, H&TC Sur. Dry. TD 2,500 ft.

Young County: Farmer & Horany 1 Rogers, Blk. 245, TE&L Sur. Dry. TD 639 Wilbert Kunkel 1 Henning, TE&L Sur. 65. Dry. TD 1,079 ft.

WEST TEXAS

Andrews County: Humble Oil & Refining Co. 2 State University "O," 20-1-University Lands. IP 202 BOPD, 14/64-in., Devonian 10,780 ft. TD 11,107 ft., elev. 3,148 ft. Extension to South Andrews field.

The Texas Co. 1 Aurelia Cobb, 16-A46-PSL. IP 448 BOPD, ½-in., Wichita Albany (?) 8,617 ft. TD 8,727 ft. New pay and extension, new field 1 mile W Andrews

The Texas Co. 1-H J. E. Parker, 15-A46-PSL. IP 528 BO 11½ hours, ½-in., 37°, Wolfcamp 8,596 ft. TD 8,823 ft. New pay.

Coke County: Midwest Oil Corp. 1 Lannie Laura Forehand, 306-2-H&TC. Dry. TD 7,384 ft., elev. 2,311 ft., Strawn 6,808 ft., Ellenburger 7,310 ft.

Norwood Drilling Co. 1 Arrott, 3-A614-W. C. Sharp Sur. Dry. TD 6,515 ft.

Hickok & Reynolds, Inc. 1 Callaway, 364-1A-H&TC. Dry. TD 5,875 ft.

Garza County: Threeway Drilling Co. et al 1 Durrett, Sec. 4, A-1065. IPP 59 BOPD, 36°, pay 3,317 ft. TD 3,427 ft.

Howard County: Urice Drilling Co. 1 J. M. Bates, 16-32-T1N-T&P. Dry. TD 441 ft.

Midland County: United States Smelting, Refining & Mining Co. 1 King, 10-40-

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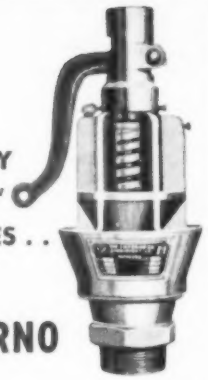

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WILDCAT COMPLETIONS

T1S-T&P. Dry. TD 13,546 ft., elev. 2,868 ft., Devonian 12,070 ft., Ellenburger 13,394 ft.

Mitchell County: Humble Oil & Refining Co. 1 Maude Farmer, 14-29-T1S-T&P. IPP 15 BOPD, 26°, pay 2,512 ft. TD 3,477 ft.

Pecos County: C. E. Marsh 1 University, 5-20-University Lands. Dry. TD 1,900 ft.

L. H. and S. A. Olsen Drilling Co. 1 Jones, 3-106-T&ST.L. Sur. IP 62 BOPD, ¾-in., 30°, pay 2,905 ft. TD 2,966 ft.

Reagan County: Humble Oil & Refining Co. 1 Sawyer Cattle Co. "L," 107-L-T&P. Dry. TD 9,553 ft., elev. 2,548 ft., Ellenburger 9,440 ft.

Reeves County: Buck Jones Drilling Co. 2 J. V. Daughetee, 20-56-T2-T&P. Dry. TD 3,192 ft.

Runnels County: Murray Petroleum Co. 1 F. F. Lett, Sec. 337, H&TC. Dry. TD 4,396 ft.

United Production Co., Inc. 1 R. S. Davis, Elisha Mather Sur. 535. Dry. TD 4,547 ft.

Webster Drilling Co. 1 Joe L. Smith, Sec. 23, BS&F Sur. Dry. TD 5,739 ft., elev. 1,870 ft., Ellenburger 5,082 ft.

Schleicher County: C. L. Norsworthy Jr. 1-A Virgil Powell, 24-A-AB&M. IP 234 M.f.g., plus spray of oil, Strawn pay 4,556 ft. TD 5,129 ft.

Sterling County: Duncan Drilling Co. 1 R. T. Foster, 13-T-T&P. Dry. TD 1,412 ft.

Winkler County: Magnolia Petroleum Co. 1 University 39862, 11-20-University Lands. IP 67 BOPD, Delaware sand pay 5,099 ft. TD 5,105 ft.

Sun Oil Co. 1-A Amburgey, 3-B9-PSL. Dry. TD 6,300 ft. in dolomite.

Yoakum County: Skelly Oil Co. 1 Alton Webb, 475-D-J. H. Gibson Sur. IP 249 BOPD, ⅜-in., pay 5,165 ft. TD 11,890 ft. Extension to Brahaney field.

SOUTHEAST NEW MEXICO

Chaves County: Great Western Drilling Co. 1 White Ranch, 1-12s-28e. Dry. TD 8,167 ft., elev. 3,765 ft., Pennsylvanian 6,800 ft., Mississippian 7,630 ft., Devonian 8,152 ft.

Lea County: W. H. Black and Hondo Drilling Co. 1 Federal, 15-20s-33e. IPP 86 BOPD, 34°, pay 3,304 ft. TD 3,355 ft.

ILLINOIS

Clark County: Ward W. Dayton 1 Saiter, NE NE SE 29-11n-11w. Dry. TD 2,406 ft.

Clinton County: Shulman Bros. 1 Farrell, NE NW SE 6-1n-2w. Dry. TD 2,675 ft.

E. J. Goldschmidt 1 Meyer-Goldschmidt, NE NW SE 2-2n-4w. Dry. TD 2,269 ft.

Crawford County: C. C. Pearson 1 Nash, NE SE SW 34-6n-11w. Dry. TD 980 ft.

Jasper County: Calvert Drilling Co. 1 Huss, C NW SE 22-6n-10e. Dry. TD 3,547 ft.

Jefferson County: Calvert et al 1 Woelfel Comm., SW SW SW 24-4s-2e. Dry. TD 3,046 ft.

Lawrence County: Henry Gwaltney 1 Powell, NE SE SE 35-5n-11w. Dry. TD 1,773 ft.

Madison County: A. W. Neal 1 Wolfe, NW SW SW 30-6n-6w. Dry. TD 641 ft.

Montgomery County: E. A. Wirth 2 Jones, SE NE NW 36-11n-5w. Dry. TD 1,906 ft.

Morgan County: Welker Oil Co. 1 Trafton, NW SE NW 8-15n-9w. Dry. TD 350 ft.

Marion County: J. W. Steele 1 Brewer, NE NE SE 26-3n-2e. Dry. TD 3,024 ft.

Washington County: Ohio Oil Co. 1 Steinkamp, SW SE SE 16-2-5w. Dry. TD 2,291 ft.

Wayne County: Coy Oil Co. 1 Wilson, NW

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WILDCAT COMPLETIONS

NW SW 19-2s-9e. Dry. TD 3,460 ft.
White County: Sun Oil Co. et al 1 Young, NE NE SE 31-4s-8e. Dry. TD 3,510 ft.

INDIANA

Dekalb County: Romer Exploration 1 Dilley, NE NE SE 6-35n-13e. Dry. TD 2,555 ft.
Dubois County: Oil Electronics, Inc. 1 Nichaus, SW NE SE 28-2n-5w. Dry. TD 1,427 ft.
Knox County: Ralph Halbert 1 Freeland-Adams, SW NE SE 4-1n-8w. Dry. TD 1,252 ft.
Pike County: C. E. O'Neal et al 1 Adams, NE SE NW 27-1n-7w. Dry. TD 1,321 ft.
C. E. O'Neal 1 Ligan, NE NW SE 22-1n-7w. Dry. TD 1,308 ft.
Spencer County: Cox Drilling Co. 1 Moesmer, NE NE SW 8-6s-6w. Dry. TD 1,524 ft.
Vanderburgh County: J. S. Young, Jr. 2 Cummings, NW SE NE 12-5s-10w. Dry. TD 1,075 ft.
Vigo County: Sun Oil Co. 1 Fox, SW NE SE 2-10n-8w. Dry. TD 925 ft.
Lowery-Turner et al 1 Fischer, NW SE NE 15-11n-8w. Dry. TD 1,621 ft.

WESTERN KENTUCKY

Daviess County: F. H. Rhodes et al 1 Thomas, NE SE SW 17-Q-31. Dry. TD 1,453 ft.
Lohman & Johnson 1 Bolger, NW NE SE NW 14-P-29. Dry. TD 1,902 ft.
Geo. E. Nelson 1 Jones, SE SE NW 4-O-31. Dry. TD 1,300 ft.
Henderson County: Geo. Hoffman 1 Haynes, NE SW SE 22-Q-26. Dry. TD 2,161 ft.
Hopkins County: Indiana Farm Bureau 1 Whitfield, NE SW SE 101K-25. Dry. TD 2,840 ft.
Muhlenberg County: Hanley & Bird 1 Muhlenburg County Farm, N½ SE SE NW 10-I-28. Dry. TD 1,944 ft.
Ohio County: H. H. Vickers 1 Johnson, NW SW SE 3-L-30. Dry. TD 1,447 ft.

MICHIGAN

Hillsdale County: Carter Oil Co. 1 Johnson, NE NE SE 7-5s-4w. Dry. TD 2,817 ft. in Niagaran.
Lapeer County: Graham Wilcox 1 Dockum, NE NE NE 20-9n-10e. Dry. TD 2,603 ft. in Dundee.
Lenawee County: Eros Drilling Co. 1 Schultz, NW SW SW 21-5s-2e. Dry. TD 1,478 ft. in Dundee.

WEST VIRGINIA

Randolph County: Middle Fork district, Nollem Oil & Gas Corp., Agt., 1-A Moore Keppel & Co., elev. 2,479 ft., 4,045,000 cu. ft., gas, Bayard sand, 1,850 ft., gas 1,860-1,862 ft., TD 1,862 ft.

FLORIDA

Lee County: Humble Oil & Refining Co. 1 Kirchkoff, C SE NE 23-45s-24e. Dry. TD 12,876 ft.
Santa Rosa County: W. G. Nelson-G. Jeffreys 1 Griswald, C SW SW 33-5n-28w. Dry. TD 9,586 ft. Elev. 214 ft., Wilcox 1,696 ft., Chalk 3,653 ft., Eutaw 5,142 ft., marine Tuscaloosa 5,800 ft., lower Tuscaloosa 6,147 ft., Massive 6,283 ft., lower Cretaceous 6,506 ft.

ALABAMA

Escambia County: Lyle Cashion and D. Gammil 1 Lindsay-Neal unit, C SE SE 19-2n-11e. Dry. TD 5,900 ft. Elev. 173 ft., Chalk 2,900 ft., Eutaw 4,328 ft., marine Tuscaloosa 5,133 ft., lower Tuscaloosa 5,320 ft., Massive 5,497 ft., lower Cretaceous 5,708 ft.
Gulf Refining Co. 1-B Alger-Sullivan, near C SW NE 35-3n-7e. Dry. TD 6,170 ft. Elev. 313 ft., Wilcox 1,275 ft., Chalk 3,338 ft., Eagle Ford 4,650 ft., marine Tuscaloosa 5,508 ft., lower Tuscaloosa 5,673 ft., Massive 5,832 ft.

MISSISSIPPI

Jefferson County: R. H. Alagood and Lyle Cashion 1-A Junkin, 3,300 ft. north from SL on section line of 11 and 12-9n-2w. Dry. TD 6,117 ft. Elev. 77 ft. Wilcox 3,600 ft., Artman 5,315 ft., base Bake shale 5,432 ft.
Walthall County: City Products Corp. 1 Rayborn, C NE SE 5-4n-10e. Dry. TD 10,804 ft.

SOUTH LOUISIANA

Beauregard Parish: Drilling & Exploration, Inc., 1 Long Bell, 8-5s-9w. Dry. TD 8,514 ft.
W. O. Woodward, trustee, 2 Long Bell, 35-5s-10w. Dry. TD 8,750 ft.
Evangeline Parish: Paul F. Barnhart and J. Ray McDermott & Co., Inc., 1 Eunice, 31-5s-2w. Dry. TD 8,307 ft.
Orleans Parish: Southwest Gas Producing Co., Inc., 2 State, Tract 2006. Dry. TD 10,801 ft.
St. Charles Parish: W. T. Burton 9 Simoneaux, 12-15s-20e. IP 48 BCPD and 1,897 M.c.f. daily, 53°, casing perforations 10,432-76 ft. TD 14,120 ft. (New pay in Des Allemands field).
St. John the Baptist Parish: Humble Oil & Refining Co. 1-C Godchaux, 91-11s-7e. Dry. TD 10,643 ft.
Terrebonne Parish: Union Oil Co. of California 11-B State Lease 540, White Lake. IP 189 BOPD, 8/64-in., 32.0°, casing perforations 11,835-40 ft. TD 12,648 ft. (New pay in West White Lake field).

THE OIL AND GAS JOURNAL

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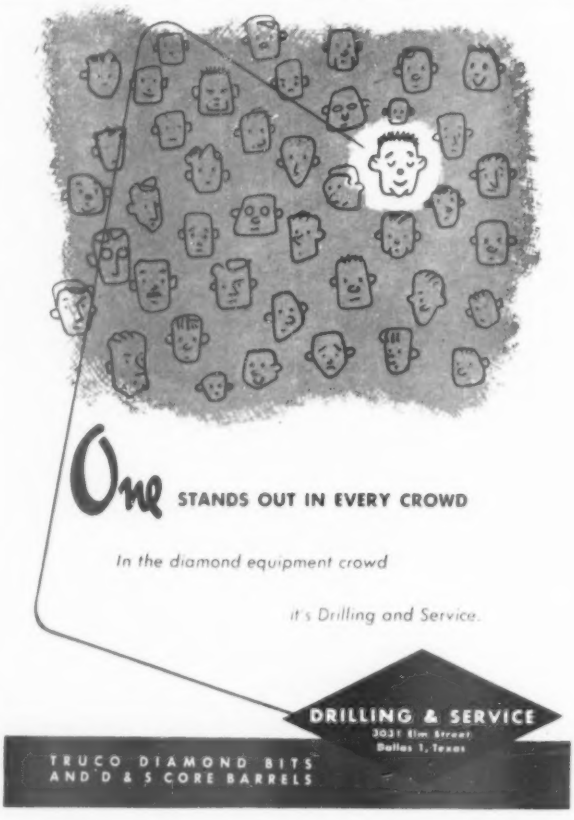
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WILDCAT COMPLETIONS

NORTH LOUISIANA

Bossier Parish: Spartan Drilling Co. 1 Martin, C SE SW 24-20n-14w. Dry. TD 9,105 ft.

Catahoula Parish: W. H. Bryant et al 1 International Paper Co. "A," C NE NW 15-10n-5e. Dry. TD 5,113 ft. Wilcox 2,565 ft.

Gulf Refining Co. 1 Campbell 1,118 ft. N, 2,599 ft. E SWc 38-7n-6e. Dry. TD 6,020 ft. Base Nebo 4,547 ft.

Justiss-Mears Oil Co. 5 Tensas Delta Lumber Co. "B," C SW SE 28-5n-5e. Dry. TD 6,212 ft. Wilcox 3,920 ft.

Red River Parish: T. J. Johnson et al 1 Sanders, 2,295 ft. S and 330 ft. E of NWc 24-14n-10w. Dry. TD 3,506 ft.

Tensas Parish: Carter Oil Co. 1 Evergreen Plantation, 15-12n-13e. Dry. TD 11,510 ft. Paluxy 9,434 ft.

Winn Parish: Sunnyland Contracting Co. 1 Tremont Lumber Co., 720 ft. S, 660 ft. W of NEc 5-10n-1e. Dry. TD 1,477 ft.

ARKANSAS

Hempstead County: Murray Petroleum Co. 1 Gunter L&T Co., 370 ft. S and 330 ft. W of NEc SE NE 30-11s-25w. Dry. TD 4,290 ft. Eagle Mills 2,677 ft.

OKLAHOMA

Beaver County: Sun Oil Co. 1 Carter-Haywood, C NE NE 4-1n-21eCM. Dry. TD 8,003 ft. Mississippi 7,860 ft.

Cleveland County: Pure Oil Co. 1 Hobaugh, SE SW SW 30-8n-1w. IPF 441 BOPD, Tulip Creek 7,893-7,959 ft., 189 M.c.f. of gas per day, 14/64-in., 35.6°, TD 8,616 ft. (Opens East Noble pool.)

Garfield County: United Transports, Inc. 1 Grassman, NW SE SE 20-20n-4w. Dry. TD 6,545 ft.

Grant County: Falcon Seaboard Drilling Co. 1 Jones, NW NW SE 4-26n-6w. Dry. TD 5,849 ft.

Harper County: Deep Rock Oil Corp. 1-A Zinn, NE NW 12-28n-24w. Dry. TD 6,500 ft.

Jackson County: Sun Oil Co. 1 Hickman, C SW SW 19-1s-22w. Dry. TD 9,100 ft.

Kay County: Kirkpatrick Drilling Co. 1 Walleen, SW NW SW 14-29n-1e. IPF 120 BOPD, Cleveland sand 3,152-65½, ½-in., 41°, TD 3,533 ft. (Oil discovery.)

Logan County: Carlock & Tharpe 1 Diedrich, SE NW NE 25-19n-4w. Dry. TD 6,467 ft.

Murray County: C. E. Moore and E. T. Fairman 1 Cozad, C W½ 21-2n-3e. IPP 4 BOPD, 830-875 ft. TD 1,100 ft. (Oil discovery.)

Osage County: Norbla 1 Osage, NE NE NW 23-24n-7e. IPF 75 BOPD, Skinner 2,392-2,402 ft., ½-in., 40°, TD 2,590 ft. (New pay at Naval Reserve.)

Pawnee County: Barton & Rich Drilling Co. 1 State School Land (Barnes), NW NW SW 36-23n-5e. Dry. TD 3,090 ft.

Pontotoc County: Wm. H. Pine 1 Mayer, NW NE SW 20-3n-8e. Dry. TD 1,862 ft.

Pottawatomie County: Vierson & Cochran 1 Johnson, NE SE NW 2-8n-2e. IPF 31 BOPD, Hunton 4,883-95 ft., 33°, TD 5,773 ft. (Oil discovery.)

KANSAS

Barton County: Helmerich & Payne, Inc. 9 Russell "A," SW SW SE 26-19s-14w. IP 5,600 M.c.f. of gas per day, Arbuckle 3,457-95 ft. TD 3,495 ft. (New pay at Great Bend Airport pool.)

Honaker Drilling Co. 1 Great Bend Airport "A," SW SW NW 4-20s-14w. Dry. TD 3,635 ft.

Sunray Oil Corp. 1 Converse, NW NE SW 20-20s-15w. IP 3,700 M.c.f. of gas

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WILDCAT COMPLETIONS

per day. Arbuckle 3,783-3,829 ft. TD 3,889 ft. (Gas discovery.)

Cowley County: McNeish & Gralapp 1 McMinn, NE NE NW 21-31s-6e. Dry. TD 2,963 ft.

Ellis County: El Dorado Refining Co. 1 Pfeifer, NW NW SE 21-12s-19w. Dry. TD 3,865 ft.

Iron Drilling Co. 1 Neiraberger, NW SE NE 32-13s-20w. Dry. TD 3,990 ft.

Musgrove et al 1 Sanders, NW NW NW 15-14s-17w. Dry. TD 3,576 ft.

Rocket Drilling Co. 1 Seibel, NE SE NE 21-14s-20w. Dry. TD 3,905 ft.

Ellsworth County: Salina Drilling Co. 1 Larson, SW SW SW 12-17s-6w. Dry. TD 3,599 ft.

Greenwood County: Smith-Sargent & Conkey 1 Johnson, NW SW SW 33-26s-9e. Dry. TD 2,543 ft.

Kingman County: Musgrove 1 Goering, NE NE NW 1-27s-6w. Dry. TD 4,375 ft.

Lyon County: Gough Davis 1 Welch, NW NW SW 31-20s-10e. Dry. TD 2,398 ft.

Pawnee County: Vickers Exploration, Ltd., 1 Bowman "B," NE NE NW 10-21s-15w. Dry. 3,773 ft.

Saline County: Lewis Kitsis 1 Phelps, CSL SE SW 4-15s-4w. Dry. TD 3,670 ft.

T. A. Phillips 1 Carlson, NE NE SW 28-16s-2w. Dry. TD 3,451 ft.

Sheridan County: Newmont Oil Co. 1 Sutor, NE SE SE 30-8s-26w. Dry. TD 4,366 ft.

Stafford County: Greenland Drilling Co. et al 1 Ratts, SE SE NW 35-22s-14w. Dry. TD 3,906 ft.

NEBRASKA

Cheyenne County: Lloyd Gray 1 Geu, NW NW SW 21-14n-48w. Dry. TD 4,648 ft.

The Chicago Corp. and Republic Natural Gas Co. 1 Beyer, SE SE SE 5-14n-50w. Dry. TD 4,981 ft.

Kimball County: Derby Oil Co.-George & Downing 1 Kleinholz, SE SE SW 19-13n-55w. Dry. TD 6,578 ft.

Nebraska Drillers 1 Lynn, SE SE SW 20-13n-56w. Dry. TD 6,852 ft.

Logan County: W. C. O'Farrell 1 Whitewater Ranch, NE NE SW 13-18n-27w. Dry. TD 3,837 ft. Cambrian 3,774 ft.

SOUTH DAKOTA

Stanley County: Paul G. Benedum 1 Schaffer, C NW NW 26-6n-27e. Dry. TD 3,900 ft. Sioux quartz 3,893 ft.

Yankton County: Oil Ventures Development Co. 1 Schultz, SE SE 4-93n-57w. Dry. TD 928 ft.

Ziebach County: Ward Dayton 1 Olson, NE NE SE 35-12n-20e. Dry. TD 5,342 ft Stoney Mountain 5,227 ft.

NORTH DAKOTA

Barnes County: Wright & Pollard 1 Guscette, C NW NW 20-142n-61w. Dry. TD 2,573 ft. Pre-Cambrian 2,572 ft.

McHenry County: Calvert Exploration 1 Fylken, C SE NE 11-156n-75w. Dry. TD 3,436 ft. Lodgepole 3,221 ft.

Ramsey County: S. D. Johnson 1 Wolfe, C NW NW 17-158n-62w. Dry. TD 3,277 ft. Pre-Cambrian 3,269 ft.

Sheridan County: E. Wilson Germany-Cardinal Drilling Co. 1 Fallow, NE SE 22-148n-74w. Dry. TD 3,993 ft. Lodgepole 3,817 ft.

Stutsman County: Herman Hanson Oil Syndicate 1 Ogilvie, NW NW 21-140n-65w. Dry. TD 3,293 ft. Winnipeg-Deadwood 3,204 ft.

Towner County: Midwest Exploration 1 Union Central Life Insurance Co., SE SE 24-160n-67w. Dry. TD 4,046 ft. Winnipeg 4,042 ft.

Wells County: Wilson Germany-Cardinal Drilling Co. 1 Seibel, C NW NE 13-145n-71w. Dry. TD 3,500 ft. Lodgepole 3,165 ft.

CALIFORNIA

Alameda County: The Texas Co. 1 Signal-Hancock 22-2s-2e. Dry. TD 2,919 ft.

Fresno County: Ladenburg-Thalmann & Co. 1 Clover, 12-16s-16e. Dry. TD 8,768 ft.

J. B. Quinn 1-65 Schramm, 15-15s-16e. Dry. TD 7,231 ft.

Kern County: C. C. Hamilton 1 Hamilton, 14-11n-18w. Dry. TD 835 ft.

Intex Oil Co. 46-33 Intex-Hancock, 33-28s-26e. Dry. TD 7,724 ft.

Standard Oil Co. of California 73 17-D, NE NW 17-32s-24e. IPF 572 BOPD, 20.5°, 18/64-in. choke, 380 psi. TP, 120 psi. CP, perforations 3,529-48 ft. TD 3,550 ft. (New Etchegoin-Pliocene sand pool on southeast edge of Buena Vista Hills.)

Union Oil Co. 65X-7 Hancock, 7-30s-21e. Dry. Bottomed in gray Point of Rocks sand (Eocene), TD 3,880 ft.

Los Angeles County: The Texas Co. 3 Newhall-A, 15-4n-16w. Dry. TD 3,513 ft.

Monterey County: Bishop Oil Co. 1 Alexander-B, 8-23s-11e. Dry. TD 2,468 ft.

Orange County: Union Oil Co. 1 Union-Del Giorgio unit, NW NE 15-3s-9w. IPP 21 BOPD plus 76 BWPD, 30.2°, perforations 4,570-4,662 ft. TD 8,120 ft. (New pool in Carbon Canyon area of Brea-Olinda field.)

Sacramento County: H. L. Alexander et al 2 Bottimore, 34-7n-7e. Dry. TD 2,500 ft.

San Luis Obispo County: Seaboard Oil Co. 72-17 Humble-Freeman, 17-25s-13e. Dry. TD 4,267 ft.

Santa Barbara County: Golden Bear Oil Co. 1 Dolcini, 32-10n-35w. Dry. TD 2,992 ft.

Santa Clara County: Leroy C. Gould 1 Hirasaki Farms, 9-11s-4e. Dry. TD 2,330 ft.

Yolo County: W. W. Holmes, Opr. 1 Mohawk-Cobb, 15-11n-1w. Dry. TD 3,000 ft.

MONTANA

Blaine County, East Bearpaw: Wood-Callahan Oil, Ltd., 1 Government, C NE NW 4-28n-21e. Dry. TD 2,384 ft. Madison 2,235 ft.

Musselshell County: The Chicago Corp.-Republic Natural Gas Co. 1 NPRR, SW SE NE 17-11n-31e. IPF 92 BOPD, Morrison discovery, new field. TD 5,208 ft. PBTD 2,874 ft.

Petroleum County, Brush Creek: Ike Taylor et al 1 Cassidy, NW NW SE 26-16n-27e. Dry. TD 2,461 ft. Lower Amsden 2,080 ft.

WYOMING

Carbon County, Table Hills: Mountain States Drilling Co. 1 Government-J. E. Manning, SW SW NE 10-25n-88w. Dry. TD 5,122 ft. Tensleep 4,916 ft.

Fremont County, South Steamboat Butte: British American Oil Producing Co. 2 Tribal, W½ NE SE 8-3n-1w. (WRM). Dry. TD 8,503 ft. Tensleep 8,065 ft.

Sheridan County, Badger Creek: Cyprus Mines Corp. 1 State, SW NW NW 16-57n-82w. Dry. TD 9,580 ft. Morrison 9,575 ft.

Washakie County, West Wyman Draw: J. Ray McDermott & Co. 1 Government, SW SW SE 33-46n-90w. Dry. TD 7,020 ft. Muddy 6,830 ft.

Weston County, South Clareton: Taylor Oil Co. 1 Fisher, SE SE NE 17-42n-65w. Dry. TD 6,840 ft. Newcastle 6,495-6,503 ft.

COLORADO

Adams County, North Middlemist area: S. D. Johnson 1 Middlemist, NE NE SE 17-2s-57w. Dry. TD 5,640 ft.

West Badger Creek area: S. D. Johnson 1 Middlemist, NE NE NW 28-2s-57w. Dry. TD 5,500 ft.

Eagle County, Glenn Anticline: Otis A. Roberts-H. O. Beadle and Mundell Bros. 1 Shaw-Government, Lot 10-3-2s-84w, C SE NE Sec. 3. Dry. TD 700 ft. Devonian 634 ft.

Kiowa County: J. M. Huber Corp. 1 Abrams, C SW NE 24-20s-49w. Dry. TD 5,200 ft. Mississippian 5,047 ft.

La Plata County: Mac T. Anderson 1 Sweatt, C NW NW 13-34n-8w. Dry. TD 3,029 ft.

Logan County: Shell Oil Co. 1 William Warnecke, SE NW SE 30-8n-53w. Dry. TD 5,353 ft.

Skelly Oil Co. 1 Korrey, SE SE SE 5-9n-51w. Dry. TD 4,793 ft.

Washington County: Vaughey & Vaughey 1 Simpson, C SE SE 24-1s-55w. Dry. TD 5,016 ft.

Weld County, Masters field: Harry Royster 1 Porter, NE NE NW 25-5n-61w. IPF 160 BOPD "J" sand 6,530 ft. TD 6,554 ft.

Falcon Seaboard 1 Duell, C NW SE 11-8n-61w. Dry. TD 8,805 ft. Big Blue 8,678 ft.

Yuma County: The Texas Co. 1 Turner, C NE SW 20-2s-47w. Dry. TD 3,600 ft. "J" sand 3,425 ft.

NORTHERN NEW MEXICO

Sandoval County: Cities Service Oil Co. 1 Government, NE SW NE 30-18n-1w. Dry. TD 1,442 ft. Dakota 1,264 ft.

SASKATCHEWAN

Shell Oil Co. A-1-13 Brooking, LSD 1, 13-6-19w2. Dry. TD 5,316 ft.

Imperial-Tide Water 16-23 Carlyle, LSD 16, 23-7-3w2. Dry. TD 4,855 ft.

Socony-Woodley-Southern 22-13 West Ilerbrun, LSD 13, 22-11-19w3. Dry. TD 4,464 ft.

Stanolind-Prelate 1 Crown, LSD 9, 34-19-24w3. Dry. TD 3,196 ft.

ALBERTA

Imperial 7-2 Bon Accord, LSD 7, 2-56-23w4. Dry. TD 3,560 ft.

Fina-Triad 1 Camrose, LSD 2, 29-46-20w4. Dry. TD 4,390 ft.

Rio Prado 5-27 Conrad, LSD 5, 27-6-15w4. Dry. TD 3,252 ft.

Trans Canada 1 W.G.C., LSD 15, 15-4-15w4. Dry. TD 3,091 ft.

El Centra et al 8-20 Drumheller, LSD 8, 20-29-19w4. Dry. TD 5,504 ft.

Canadian Superior-Unit 9-19 Morton, LSD 9, 19-38-25w4. Viking sand oil well. TD 6,939 ft. PBTD 4,960 ft.

Mill City et al 1 Anton, LSD 11, 1-39-9w4. Viking sand gas well. TD 3,125 ft.

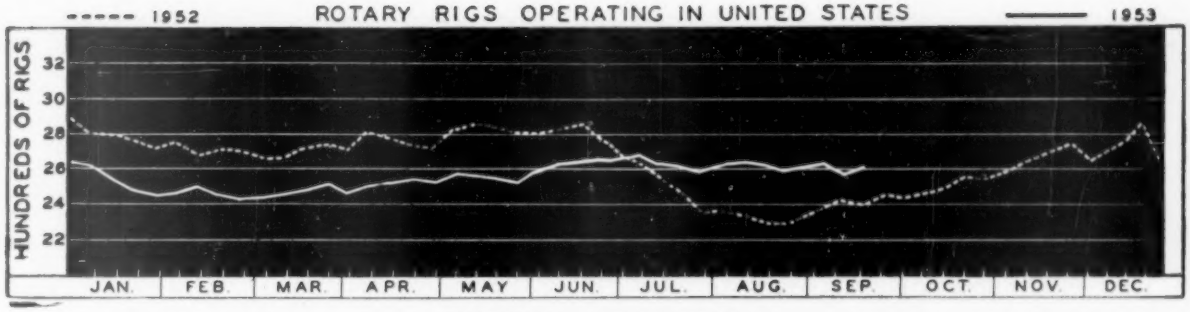
Texaco 1-B Chin Coulee, LSD 7, 13-9-14w4. Dry. TD 3,241 ft.

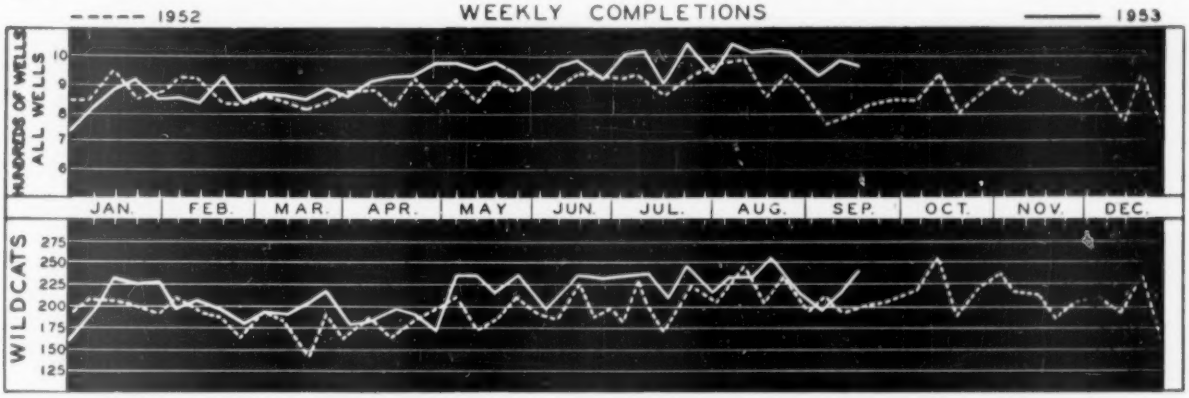
BRITISH COLUMBIA

Fargo 1 Butler Ridge, located on Permit 326 (Unsurveyed). Dry. TD 1,392 ft.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 1240 acres of public domain land, in three separate parcels, within the known geologic structure of North Shugart field, New Mexico, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., E.S.T., October 28, 1953, when bids will be opened. Details of the lease offering and how and where to submit bids may be obtained upon request from the Manager of the Land and Survey Office, Santa Fe, New Mexico, or from the Bureau's Washington office. L. E. Hoffman, Chief, Division of Minerals.





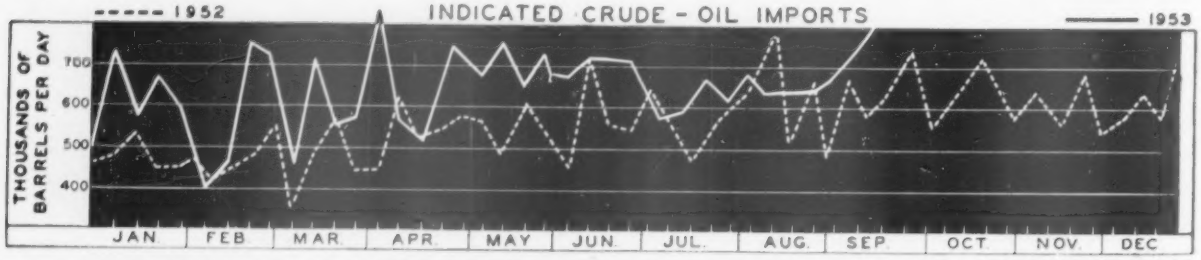
CURRENT STATISTICS

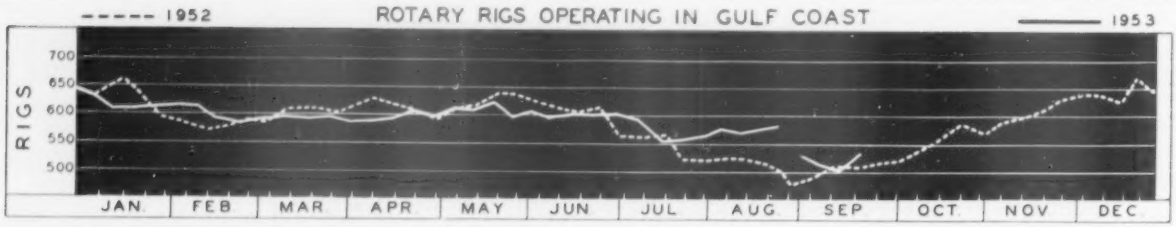
EXPLORATION

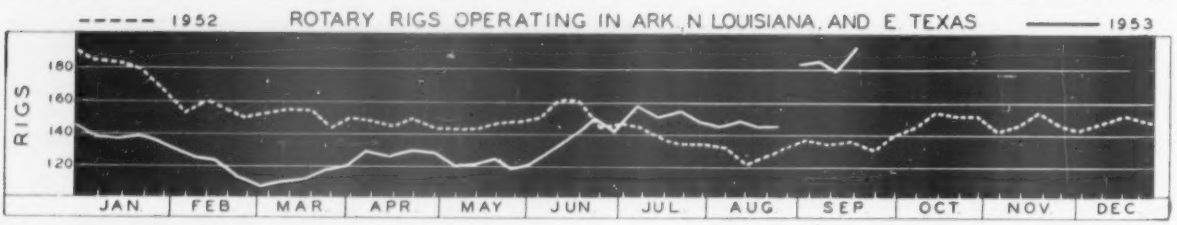
WEEKLY WELL COMPLETIONS . . . WEEK ENDED SEPTEMBER 19, 1953

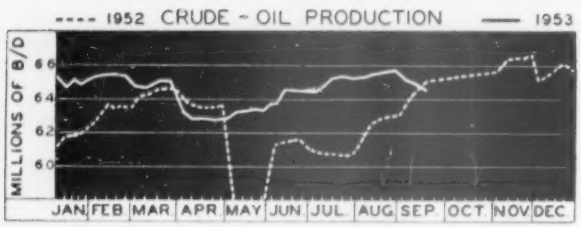
	Total of all wells					Sept. 19		Wildcat completions and discoveries										
													Cumulative total, 1953					
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	17	9	0	*8	24,500	537	582	0	0	0	0	0	0	0	0	0	0
Pennsylvania	45	19	5	†21	84,000	1,339	1,429	0	0	0	0	0	0	0	3	11	14
West Virginia	8	1	7	0	58,783	444	427	0	0	1	0	1	0	0	9	4	13
Ohio	12	4	2	†6	24,732	747	745	0	0	0	0	0	2	0	3	13	18
Indiana	33	12	0	21	50,358	941	889	0	0	0	9	9	11	0	2	253	266
Kentucky	24	5	3	16	51,978	800	923	0	0	0	9	9	7	0	1	136	144
Illinois	71	33	0	38	168,259	1,387	1,460	0	0	0	14	14	5	0	0	296	301
Michigan	10	6	0	4	29,375	427	507	0	0	0	3	3	12	0	5	174	191
Kansas	69	27	8	‡34	229,922	3,481	3,327	0	0	2	15	17	73	0	30	553	656
Nebraska	12	5	0	7	60,100	243	200	0	0	0	5	5	14	0	4	104	122
Oklahoma	136	86	4	§46	487,701	5,250	4,150	5	0	0	8	13	87	6	26	453	572
Texas	295	184	7	104	1,440,230	12,296	12,815	23	2	0	77	102	644	43	134	3,030	3,851
North Central (Dist. 7-B & 9)	106	69	0	37	379,684	4,625	4,102	11	0	0	24	35	335	0	14	1,224	1,573
West (Dist. 7-C & 8)	84	66	0	18	457,405	2,683	3,945	9	0	0	13	22	134	2	12	484	632
Panhandle (Dist. 10)	5	3	2	0	15,002	561	503	0	0	0	0	0	0	2	0	15	17
Eastern (Dist. 5 & 6)	15	3	1	11	92,926	566	595	0	0	0	9	9	15	2	4	198	219
Gulf Coast (Dist. 2 & 3)	39	26	2	11	253,143	1,816	1,915	3	1	0	8	12	82	17	55	479	633
Southwest (Dist. 1 & 4)	46	17	2	27	242,070	2,045	1,755	0	1	0	23	24	78	20	39	630	777
Louisiana	74	43	2	29	505,452	1,876	1,658	1	1	0	12	14	57	26	17	257	357
Northern	37	22	2	13	140,709	773	886	0	0	0	7	7	7	2	2	97	108
Southern	37	21	0	16	364,743	1,103	772	1	1	0	5	7	50	24	15	160	249
Arkansas	13	9	0	4	55,016	369	278	0	0	0	1	1	11	0	0	80	91
Mississippi	4	0	1	3	27,999	260	258	0	0	0	2	2	12	1	4	124	141
Southeastern States	4	0	0	4	34,532	106	48	0	0	0	4	4	1	0	0	87	88
Montana	11	7	0	4	29,848	291	206	1	0	0	2	3	11	0	0	72	83
Wyoming	24	18	0	6	132,994	516	473	0	0	0	5	5	17	0	1	94	112
Colorado	21	8	0	13	108,302	493	305	1	0	0	10	11	22	0	9	218	249
Utah	0	0	0	0	0	50	53	0	0	0	0	0	2	0	4	28	34
New Mexico	23	9	12	2	108,425	976	757	1	0	0	2	3	15	0	10	89	114
California	46	31	0	15	205,705	1,832	1,741	2	0	0	13	15	47	0	8	414	469
North Dakota	8	0	0	8	27,322	186	64	0	0	0	7	7	7	0	0	46	53
Miscellaneous (S. D.)	3	0	0	3	10,170	57	85	0	0	0	3	3	1	0	3	37	41
Total United States	963	516	51	396	3,955,693	34,934	33,380	36	3	3	201	241	1,058	76	273	6,573	7,980
Total previous week	996	497	82	417	3,822,691			25	0	7	185	217	1,024	73	270	6,372	7,739
Total September 20, 1952	822	389	62	371	3,452,913			15	0	5	183	203	1,010	63	182	6,120	7,375

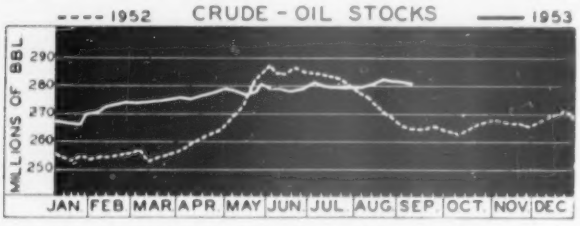
Service wells included: *8, †18, ‡1, §2.











CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	Sept. 12, '53	Sept. 5, '53	Sept. 13, '52
Pennsylvania Grade	2,749	2,784	2,358
Other Appalachian	2,411	2,379	2,198
Illinois, Indiana, Michigan	11,780	12,236	12,378
Arkansas	2,924	2,851	2,975
Louisiana	16,955	17,248	15,837
North	2,760	2,809	2,288
Gulf	14,195	14,439	13,549
Mississippi	3,583	3,685	3,533
New Mexico	8,654	8,894	7,171
Oklahoma and Kansas	41,289	39,008	38,224
Texas	130,852	132,155	126,542
East Texas	11,062	11,028	13,080
West Texas	58,330	58,172	57,179
Texas Gulf	27,985	27,665	26,138
Other Texas	33,475	35,290	30,145
Rocky Mountain	16,836	16,390	14,950
California	31,506	32,851	31,113
Foreign	‡11,326	10,746	7,071
Total	280,865	281,227	264,350

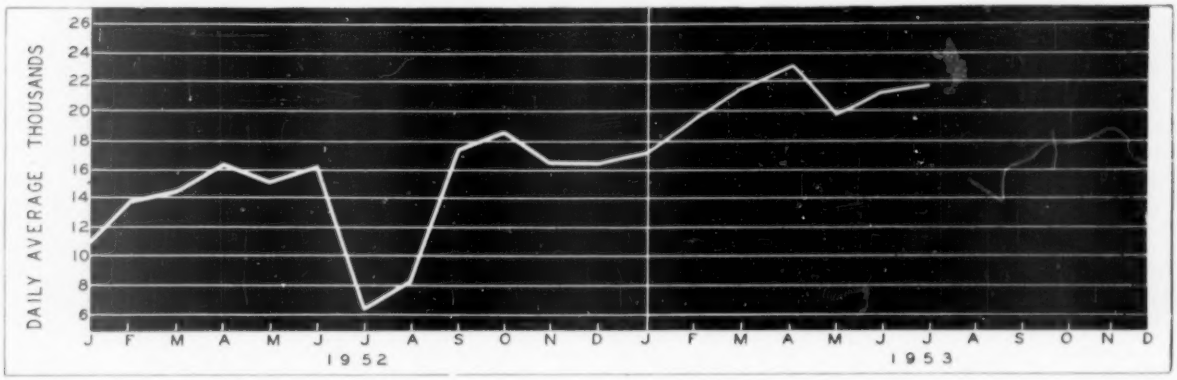
*Bureau of Mines. ‡Includes 4,294,000 bbl. in California.

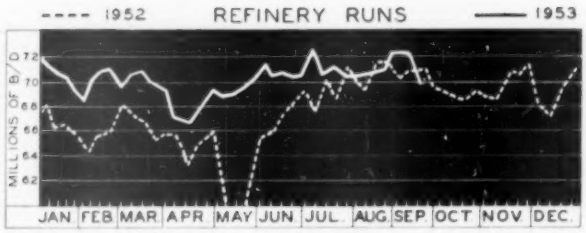
DAILY AVERAGE PRODUCTION FOR WEEK

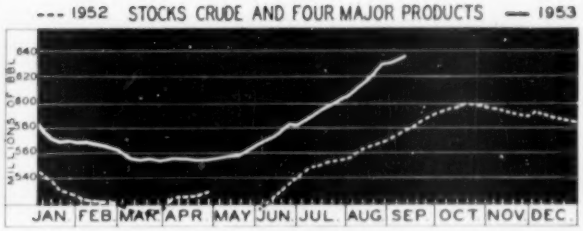
	September 19			Sept. 12
	Crude oil	Lease condensate	Total	total
Alabama	5,200		5,200	5,300
Arkansas	77,450	400	77,850	78,250
California	1,002,900		1,002,900	1,003,600
Colorado	116,100		116,100	109,000
Eastern	59,200		59,200	59,200
Florida	1,525		1,525	1,525
Illinois	167,800		167,800	161,600
Indiana	35,000		35,000	34,700
Kansas	319,600		319,600	329,800
Kentucky	31,400		31,400	31,600
Louisiana	662,375	38,700	701,075	703,675
North	105,850	2,700	108,550	111,150
South	556,525	36,000	592,525	592,525
Michigan	32,500		32,500	32,600
Mississippi	92,750	3,350	96,100	96,300
Montana	31,000		31,000	32,600
Nebraska	15,800		15,800	16,300
New Mexico	200,750	550	201,300	201,400
Oklahoma	546,100		546,100	556,100
Texas	2,736,150	45,000	2,781,150	2,793,225
Dist. 1	39,575	350	39,925	39,925
Dist. 2	149,500	5,500	155,000	155,000
Dist. 3	444,500	22,800	467,300	467,300
Dist. 4	258,000	5,700	263,700	263,700
Dist. 5	48,250	400	48,650	48,650
Dist. 6	126,975	4,900	131,875	131,875
East Texas field	252,000		252,000	252,000
Dist. 7-B	116,675	50	116,725	116,725
Dist. 7-C	161,200	4,200	165,400	165,400
Dist. 8	875,950	700	876,650	888,725
Dist. 9	188,525	350	188,875	188,875
Dist. 10	75,000	50	75,050	75,050
Utah	5,000		5,000	5,100
Wyoming	212,000		212,000	215,300
North Dakota	13,900		13,900	14,200
Total U. S.	6,364,500	88,000	6,452,500	6,481,375
Change from previous week, down			28,875	
Canada	282,575		282,575	257,900
Total U. S. production January 1-September 19				1,691,463,625 bbl.
Same period last year (crude plus cond.)				*1,617,770,325 bbl

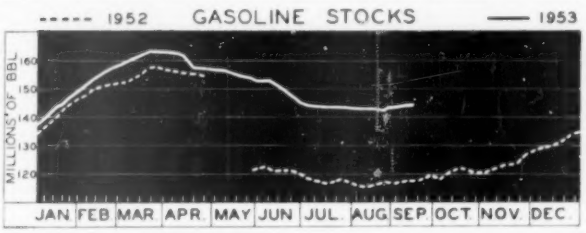
*Includes 22,610,735 bbl. condensate.

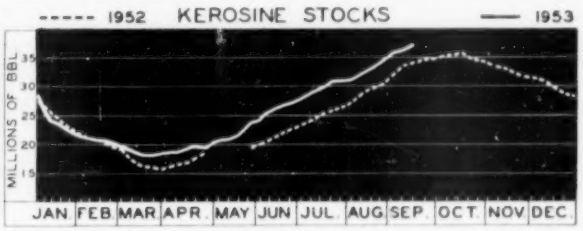
MOTOR-VEHICLE SALES (DOMESTIC MARKET)

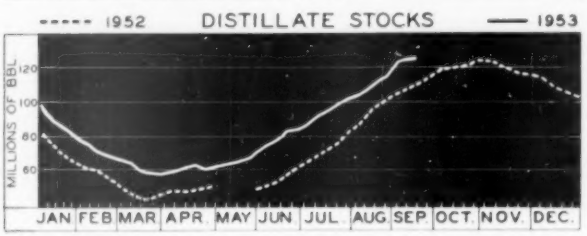


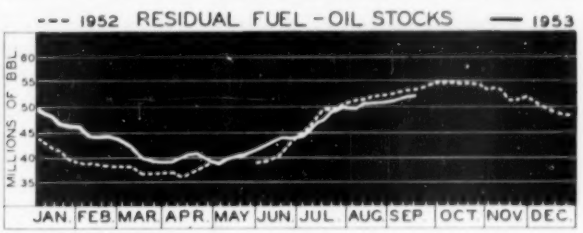










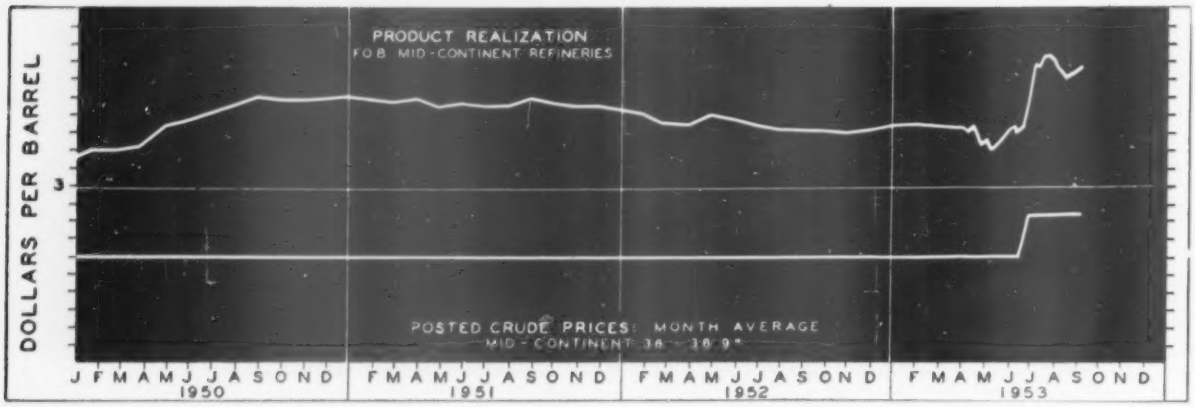


A.P.I. REFINERY REPORT, SEPTEMBER 19

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, September 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,016	444.4	35.3	240.6	224.0	33,655	14,902	44,935	13,682	1,079	437.0	50.6	257.4	223.4
Appalachian:														
District 1	100	45.3	5.7	19.0	9.7	3,596	616	1,579	723	114	46.8	6.0	17.3	12.2
District 2	83	47.0	4.9	11.1	8.7	1,629	580	605	125	79	41.0	3.0	12.7	16.6
Ind., Ill., Ky.	1,264	722.3	69.6	211.1	172.6	28,253	9,472	22,459	4,717	1,283	704.2	71.3	238.2	158.7
Okla., Kans., Mo.	573	333.7	27.3	111.6	49.9	14,727	2,674	13,319	1,146	576	335.1	14.7	138.1	56.4
Inland Texas	252	182.4	13.2	53.7	31.1	5,660	651	2,266	1,542	256	183.1	11.7	45.0	37.9
Texas Gulf Coast	1,695	835.2	101.7	377.6	232.4	19,825	4,302	15,412	7,228	1,729	815.6	123.4	414.5	267.1
La. Gulf Coast	568	287.4	30.4	162.3	53.4	8,124	2,836	7,434	1,629	508	256.1	50.1	140.9	56.8
N. La. and Ark.	87	34.1	6.1	17.7	6.6	2,925	588	820	116	87	36.3	7.2	21.4	6.7
Rocky Mountain:														
New Mexico	15	10.1		2.0	3.0	160		35	26	16	10.4	0.6	2.5	3.4
Other Rocky Mtn.	265	129.6	2.1	60.3	45.6	4,611	340	2,753	1,032	246	117.8	5.9	46.9	44.2
California	1,074	455.2	10.1	133.6	381.4	20,575	397	14,572	20,198	1,044	444.9	5.4	166.9	346.2
Sept. 19, 1953	6,992	3,526.7	306.4	1,400.6	1,218.4	143,740	37,358	126,189	52,164	7,017	3,428.3	349.9	1,501.8	1,229.6
Sept. 12, 1953	7,216	3,551.1	316.4	1,463.4	1,259.4	143,487	36,799	125,664	51,760					
Sept. 20, 1952	7,075	3,425.7	389.7	1,468.3	1,217.9	118,315	34,680	112,472	53,484					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.68 for week ended September 12, $3.66 for previous week, and $3.32 for September 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of September 23, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11.125-11.625	13-13.8	11.25-11.75
Premium gasoline	12.25-12.875	14.5-14.8	12.25-12.75
42-44 w.w. kerosine	8.875-9.25	10.15-10.4	9-9.5
No. 2 straw fuel oil	7.875-8.25	9.15-9.4	8-8.5
No. 6 residual	$1.10-1.25	$2.15-2.40	$1.80-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6.375	5.875	6.125
Grade 18-55	7.65	7.15	7.40

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-21.5
200 vis, No. 3 neutral, 0-10 pp.	14.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	25.5
180 vis., 10 p.t. neutral	27.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

ONLY slight improvement has been reported in sales of heating distillates in the Mid-Continent and North Central districts. Cooler weather in the northern states has resulted in more activity related to final plans for the winter supply than in actual sales or shipping instructions.

Gasoline continues to be soft in almost all marketing areas of the country, even on the West Coast. In the Mid-Continent and North Central areas most of the pressure for the past few weeks has been at pipe-line terminals. This condition resulted from the need to clear some of the gasoline from terminal storage to make more room for normal increases in distillate inventories before the opening of the heating season.

Since less gasoline will be shipped through the line for the next few months, gasoline stocks will tend to build up at Mid-Continent refineries rather than at terminals in the North Central districts. This shift may furnish temporary relief from severe pressure on gasoline. Normal movement of distillate fuels to pipe-line terminals over the next few weeks could help provide storage space at refineries for the expected increase in gasoline stocks.

Movement of distillate fuels out of primary storage in the summer-discount area of the East Coast was much less in the first 3 weeks of September than some suppliers had expected. Most of the quotations for No. 2 fuel for barge delivery in New York Harbor are still 9.15 cents a gallon, but reports indicate that some material is available at about 9 cents.

Unless deliveries for the last 10 days of the month are abnormally high, excessive primary stocks will keep pressure on the market. Primary suppliers may permit the discount to expire at end of September. However, current data indicate that plenty of material will be available at prices below any postings that are current quotations plus 0.5 cent a gallon.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.50		$2.37
21-21.9	2.30	2.52		2.39
22-22.9	2.37	2.54		2.41
23-23.9	2.45	2.56		2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective September 21, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.05
Southwest Pennsylvania	3.61
West Virginia	3.55
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EQUIPMENT FOR SALE

MODEL E363-42 Cooper well service unit, servicing to 9000 ft., skid mounted, 8x10x60' mast, excellent condition, $4,500.00. The Zelligson Company, Tulsa, Oklahoma. 8-4477. P.O. Box 5008.

5395 FT. 4½" O.D. 16.60# National Tube Grade "D" Drill Pipe, with Hughes Flash-weld Hard-faced Joints. Mill shipment price. Immediate delivery at Midland, Tex., yard. Mid-Union Drilling Corporation, 624 South Cheyenne, telephone 4-6163, Tulsa, Oklahoma.

FOR SALE—ELI Model M-6 portable drilling rig on GMC Truck. Ideal for water wells. Will consider good spudder as trade. Vaughn & Taylor Construction Co., Inc., 2103 North Grant, Odessa, Texas. Phone 7-2091.

Gase Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
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FOR SALE

New Pipe, Casing, Tubing

5,950'—1½" (1.9" OD) XH, CW x 20' RL
6,660'—1½" (1.9" OD) XXH, CW x 20' RL
2,512'—2" (2.375" OD) STD., 4.5#, J-55, SS, upset tubing x 30' RL
8,685'—2½" (2⅞" OD) Std., 6.5#, J-55, SS, upset tubing x 30' RL
6,600'—4" OD x .134" wall, 5.53#, PE, EW, 1200# test x 40'
1,068'—4" (4½" OD) Std., .237" wall, 10.79#, SS, PE x 40' RL
42,080'—4" (4½" OD) Std., .237" wall, 10.79#, EW, 2200# test, beveled ends x 30'-40' RL
10,000'—4" (4½" OD) Std., .237" wall, 10.79#, SS, A-106, PE x 20' RL
1,920'—4" (4½" OD) Std., .237" wall, 10.79#, EW, 2200# test, T&C x 30'-40' RL
5,476'—5½" OD x 15.5#, SS, J-55 x 30' RL casing
25,000'—5½" OD, 17#, LT&C, J-55, SS, casing x 30' RL
1,124'—6⅝" OD x .280" wall, 18.97#, beveled ends, A-106, Grade B, SS, x 20'-40' RL
3,865'—7" OD, 20#, SS, J-55 casing x 30' RL
17,960'—8⅝" OD, .250" wall, 22.36#, EW, beveled ends, API, 1300# test x 20'-40' RL
817'—16" OD, .500" wall, 82.77#, SS, A-106, Grade B x 20'-40' RL

Attractively Priced

Horwitz Pipe & Steel Co.
Oklahoma City, Okla.
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EQUIPMENT FOR SALE

FOR SALE: 5—Shriver 42"x42" cast iron Filter Presses, Plate & Frame Type, 27, and 54 chambers 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; ±12 Sweetland Filter for 72 mo...el covered leaves on 2" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

WILSON Giant Drawworks equipped make and break cathead. 2 P.C. 1879 Buda Engines. All this equipment in A-1 condition. Priced right to sell. Box G-711, The Oil and Gas Journal, Tulsa, Oklahoma.

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SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma

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New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.

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EQUIPMENT FOR SALE

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REPRESSURING plant with Ingersoll-Rand compressor 4¼ X 10 and 10 X 10 Imperial type XOB10, 50 HP 2 cycle Superior engine, circulating pump, 2 200 bbl. cypress tanks, orifice flanges, scrubbers, building. Complete in every respect with lots of new spare parts. Write or call R. A. Putman, phone 2-6663, City National Bldg., Wichita Falls, Texas.

TWO Mayhew 1000 drills mounted on International trucks, 2 years old, excellent condition. Box 275, Phone 340, Andrews, Texas.

FOR SALE: U-15 rotary rig like new, including trailer house fully equipped. Wonderful buy. Available only because of health. Now drilling in West Texas. Inspect while in operation to get better idea. H. W. Sullivan, 611 Gulf States Bldg., Dallas 1, Tex.

WATER FLOOD EQUIPMENT for Sale in East Kansas; One 100 H.P. Waukesha engine, $500.00; One 40 H.P. Bovaird-Seyfang gas engine with cutoff coupling clutch, $350.00; Two 3 x 8 Worthington pumps, $200.00 each. For further information contact D. K. Auld, Deep Rock Oil Corporation, Garnett, Kansas, or Joe A. Huitt, Tulsa.

USED EXCELLENT CONDITION
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One Each (4¾" to 1") (8⅝" to 2⅜") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

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60,000' 3½" OD weight 6.50 TC electric weld and seamless, new.
45,000' 4½" OD weight 9.50 T & C electric weld and seamless, new.
10,000' 2⅜" OD J-55 weight 4.70 upset tubing, new.
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All above priced to sell. Cash or terms.

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REASONABLY PRICED

126' Lee C. Moore Mast with 5'6" high Substructure.
G-36 Emsco Drawworks with two JL-1335 Buda Engines.
FXZ Gardner-Denver 7¼" x 12" Pump.
150-Ton Swivel and Traveling Equipment.
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Two water pumps, water well jack 7" and 10¾" casing tools, Overshot, two tool houses, good water tanks, ample line pipe, shale shaker and complete accessories.
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TULSA, OKLAHOMA

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WILSON GIANT RIG, 500 Transmission, 2 L.I. 600 Cummins Diesel Engines Compounded, 7¼ X 14 Pump, 95' Hispeed Lee C. Moore Mast, Drill Pipe nearly new. Complete ready to run. Price $57,500.00. Box G-700, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: At Madison, Kansas, 40 tons of ¾" and ⅞" used pull rods with clamps. Suitable for reuse or construction purposes. These rods are clean and reasonably straight. Price $80.00 per net ton. Also 20,000' ¾" sucker rods recently reclaimed from waterflood operations. Suitable for reuse. 15c per foot. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FAILING MODEL 1500—on contract with major client in Montana. Write for details to Box G-703, The Oil and Gas Journal, Tulsa, Oklahoma.

LATE FRANK WHEATLEY 7 X 10 power pump on 8 inch skids with sheave and belt guard A1 condition $1800. J. A. Finlayson, 108 E 4th, Tyler, Texas. Ph. 3-3563.

NEW 145GKU Waukesha Engine used less than 90 days. Perfect condition. Delivered cost $3,500.00, sell for $2,850.00. Reed Drilling Co., Inc., Philtower Bldg., Tulsa, Okla. Phone 2-9638.

OIL FIELD EQUIPMENT

Greenwood County, Kansas—Near Quincy, Kansas, 4 wells—1380' in depth, 4½" casing, 2" tubing, ⅝" rods, misc'll fittings, lead line, Jensen & National Pumping Units with electric motors & time clocks, 2—100 bbl. tanks, 1—Redwood Gun Barrel. Equipment less than 3 years old. New cost of equipment over $16,000.00. Sale price $8500.00. Woodson County, Kansas—Near Gridley, Kansas, 12 wells—1650' in depth, 4½" casing, 2" tubing, ⅝" rods, misc'll fittings, lead line, Jensen & Bethlehem pumping units with electric time clocks. Equipment less than 4 years old. New cost of equipment over $45,000.00. Sale price $25,000.00. Woodson County, Kansas—Near Yates Center, 2 wells—1600' in depth, 4½" casing, 2" tubing ⅝" rods, misc'll fittings, lead line, 1—Jensen Pumping Unit, 2—100 bbl. tanks (old), 1 Redwood Gun Barrel (old), 1 well pulled—Equipment on ground. Equipment in wells less than 1 year old. New cost of equipment over $9500.00. Sale price $4500.00. Marion County, Kansas—Near Hillsboro, Kansas, 1 well—2800' in depth, 5½" casing, 2" upset seamless tubing, ⅝" rods, misc'll fittings. 1—100 bbl. tank. Equipment less than year old except ⅝" rods. New cost of equipment over $8000.00. Sale price $4150.00. New cost of equipment on all leases was in excess of $78,500.00. If equipment is sold to one purchaser the price is $40,000.00; however, equipment may be sold by well or by lease. For further information contact—Geo. B. Emery, Jr., Box 498, Topeka, Kansas, Telephone 3-6770, Topeka.

EQUIPMENT FOR SALE

EQUIPMENT FOR SALE

NOW AVAILABLE FOR IMMEDIATE DELIVERY

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OUTSTANDING FEATURES

★ 2500 BBL. Crude Unit
★ 1770 BBL. Thermal Cracking Unit
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★ **100 BBL. POLYMERIZATION UNIT**
(Installed new 1951, skid-mounted)

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TOTAL CAPACITY—50 MILLION CUBIC FEET PER DAY

Wire — Phone — Write

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7—8000 GAL. R.R. TANK CAR tanks with heating coils in New Jersey $685 each. Lestan Corp., Rosemont, Pa.

VACUUM PUMP: Unused 1946 Model—Ingersoll-Rand Model V-67 Single Stage—Size 6 X 6 X 5 with 2" Suction and Discharge, equipped with 5 HP General Electric 440 Volt Motor 3 phase 60 cycle, 1750 R.P.M. F.O.B. Price, St. Elmo, $500.00. SCHROEDER & HERMANN, 898 Haller Ave., Wood River, Illinois.

FOR SALE at Okla. City whse., 1 used 8" x 3¼" x 8" Ingersoll-Rand type 20 high pressure, 2 stage portable compressor. Serial #PP71898 driven by model GU2S 5⅜" x 6¼" Waukesha engine Serial #76426 mounted on steel wheels. Price $1500.00. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

FOR SALE—5000' of 4½" OD drill pipe with Hughes tool joints. Good condition for medium drilling. Located near Abilene, Tex. Subject to inspection. WELSH, 609 Gulf States Bldg., Dallas, Tex. PR-5668.

90 H.P. 2 CYCLE Superior Direct Driven Compressor Unit with 5½" high and 11" low pressure Cylinders, with Novo Air starting unit and steel house. Suitable for pulling vacuum and recycling gas. Near Pawhuska, Okla. Earl Davis, P.O. Box 7005, Tulsa 18, Okla.

FOR SALE: 1951 Gessna 195; 245 HP; 400 total hours; Cross-wind Gear; VHF; OMNI; Gyros; Hangared; Brand new condition; one owner; $10,000.00; write Box G-582, The Oil and Gas Journal, Tulsa, Oklahoma.

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A SURE SOURCE OF SUPPLY AT ALL MARKET LEVELS FOR CASING, TUBING AND LINE PIPE. INQUIRIES SOLICITED.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED soon used natural gasoline plant to extract natural gasoline, butane and propane to handle 4 to 8 million C.F. daily wet gas. Goodalls, Ogallala, Nebr.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

PETROLEUM ENGINEERS

Major Oil Company in Venezuela has openings for Graduate Petroleum Engineers with 1 to 3 yrs. Production experience; to conduct Engineering Studies on Production Methods, Procedures, & Special Projects.

Also having openings for Petroleum, Mechanical & Chemical Engineers for work in Production, Drilling & Gas Departments.

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AN AUCTION
PIPELINE AND DIRT MOVING EQUIPMENT

Thursday, October 15th at 11 A. M. (CST) Little Rock, Arkansas, 1615 East 15th Street.

35 TRACTORS—9 Cat D-8 Tractors, Serial Numbers from 1H Series to 2U-8039, are all equipped with either Cardwell or Trackson Sidebooms. Cat 75 w/Cardwell sideboom. 2 Cat D-7's with angle dozers, #24 front pcu and Hyster rear winches, 4T Series. Cat D-7 tow tractor, 4T, w/Hyster winch. 3 Cat D-7's w/Cardwell or Trackson pipelayers; 7M Series. AC HD-20 w/like new angle dozer, Baker DDPCU. AC HD-19 w/hyd angle dozer and Carco rear winch. TD14A & TD-14 tow tractors w/Isaacson & Carco rear winch. 2 TD-14's w/Cardwell pipelayers. 3 TD-18A and 3 TD-18 Tow Tractors w/Lufkin, Hyster or Carco rear winches. 7 TD-18's w/Cardwell pipelayers.

DRAGLINES & BACKHOES—Lorain 80J Dragline, S/N 20889, Cat D-13000 engine, 60' boom, 2 yard bucket—A '51 machine with very little use, in excellent condition. 2 Lorain L50K backhoes, Cat D-318 engines, one has swamp tracks, '50 & '51 machines. 2 Insley K-12's, one backhoe & 1 dragline, Cat D-311 engines. Hyster "Karry-Krane" Model KC, 5 ton cap. IHC TD-9 hyd endloader.

NOTE:—All of this equipment is in very good condition, right ready for the job, the rails and rollers on the tractors, except 3 or 4, are very good. Inspect and operate at any time before the sale.

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— EQUIPMENT AUCTION LEADERSHIP SINCE 1921 —

HELP WANTED

CHEMIST to take charge of large independent oil company laboratory located in Great Lakes area. All applications strictly confidential. Experience required in laboratory administration. Give full details of education and experience. Reply to Box G-687, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATIVES WANTED: Manufacturer of Test Separators, Well Testers, Metering Separators, Oil and Gas Separators, Free Water Knockouts (Crude Oil and Natural Gas), Emulsion Treaters, Water Filters, Gas Scrubbers, and related equipment wants Commission Sales Representatives for following territories: (1) Oklahoma, (2) Kansas, (3) Tri-State Area (Illinois, Indiana, and Kentucky), (4) West Texas, (5) North Texas, (6) East Texas, (7) South Texas, (8) Rocky Mountain, (9) Williston Basin, (10) California, (11) Canada, and (12) Mexico. Please give details concerning present Sales Coverage and Personnel when answering. All replies confidential. Box G-701, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising, testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
Box OG-5

Arabian - American Oil Company

505 Park Avenue
New York 22, N. Y.

EQUIPMENT INSPECTION ENGINEERS

South America

A major oil company affiliated with Standard Oil Company (N. J.) needs graduate engineers with several years' refinery process equipment inspection experience. Must be qualified to interpret codes and specifications, predict equipment renewals, and recommend replacement equipment.

Write giving age, martial status, education, and full details of experience.

Box 308-K
Radio City Station
New York 19, N. Y.

HELP WANTED

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

MANUFACTURERS AGENT, Commission Sales Representative, or Sales & Service Firm to handle outstanding lines of oilfield specialty products for Manufacturer-Distributor. Must have close personal contacts with steam and power drilling rigs and operating personnel in area. Several territories available: portions of Louisiana and Texas Gulf Coast, Rio Grande Valley, East Texas, possibly others. Box 6352, Houston 6, Texas.

OVERSEAS. Contracting, Engineering and Oil firms; big pay, no U.S. taxes, cheap living costs. Send $1 for list 100 names where to apply. Foreign jobs, Box 166, Washington 4, D. C.

SEISMIC SUPERVISOR required by expanding and aggressive seismic contracting company. Should have ability to supervise any domestic area and have good professional contacts. Minimum requirements; college degree in geophysics or related fields and eight years' seismic experience. Good future. Tulsa location. Box G-705, The Oil and Gas Journal, Tulsa, Oklahoma.

Geophysical Personnel

Newly organized subsidiary of Standard Oil Company of California needs Party Chiefs, Computers, and trainees with educational background in geological and geophysical sciences.

Please write giving full particulars regarding personal, educational and experience qualifications or call for appointment interview.

CHEVRON OIL COMPANY
3800 West Alabama
Houston 6, Texas

SITUATIONS WANTED

CHEMICAL AND GAS ENGINEER: 33 years old, single, M.S. in chemical and gas technology. (Institute of Gas Technology). Five years experience in chemical, four in natural gas industry. Chemical research, Supervisory experience. All phases of natural gas design, FPC reports and testimony. Economic studies. Know accounting. Technical articles published. Box G-684, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, University of Wisconsin 1950, married, age 31. Desires position with future. Box G-692, The Oil and Gas Journal, Tulsa, Oklahoma.

DUTCH GEOLOGIST, M.S. degree, desires position in States. Six years experience subsurface and field work, mainly Indonesia wth Standard-Vacuum. Seven months experience in States. 2107 Dublin Road, Oklahoma City. TRinity 8-3666.

OIL COMPANY ACCOUNTANT, Secretary, Office Mgr.—Full Charge—Age 41, 21½ yrs. Corporation, Partnership, Individual and Estate experience. Miss Opal Wolf, WI-5194, 3324 Parkridge, Fort Worth, Texas.

CANADA: Geologist, 33, Family, German Immigrant, arriving October. Three years' experience, mainly subsurface. State nature of position, location. Box G-696, The Oil and Gas Journal, Tulsa, Oklahoma.

LATIN AMERICAN EXPERIENCE, 15 years, government ministries, geology, concessions, drilling. Graduate engineer with over-all executive experience on pioneer exploration programs for oil. Box G-710, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, B.S., 28, married, 26 months oil field experience, desires job anywhere in U. S. Write Box 1751, Hobbs, New Mexico.

GRADUATE ENGINEER, age 30, completed production engineering training program with major and 2 years' engineering drilling experience. Desires position as production or drilling engineer with independent oil company. G-706, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

LANDMAN—Legal training and 7 years experience major company office and field. Desires change to expanding independent. Can relocate and travel. Box G-675, The Oil and Gas Journal, Tulsa, Oklahoma.

CONST. SUPT. & ENGR. Completing refinery construction contract Middle East. Desires contacts leading to foreign contract. 15 years' heavy construction. Some Spanish. Box G-694, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST. 2½ years interpretive and computing experience in geophysics with major company. 1951 graduate. Richard Farrar, 3636 Urban, Dallas, Texas. Phone EVergreen 2390.

GEOLOGIST, Mining-Petroleum. Experienced in: surface and subsurface mapping, exploration, writing reports, surveying, drilling. Colorado Plateau experience. Box G-708, The Oil and Gas Journal, Tulsa, Oklahoma.

CHIEF Geophysicist for Independent Geophysical concern, with eight years' geophysical and geological training and experience. Am set up to handle seismic review work of West Texas and New Mexico area. All reports and evaluations held in strictest confidence. Box G-702, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST experienced Kansas leasing, geology, drilling, desires connection with independent oil company or group desiring representation in Kansas. Lease and subsurface data currently maintained. Box G-709, The Oil and Gas Journal, Tulsa, Oklahoma.

MAILING LISTS

MAILING LISTS of the oil industry. Our 30th year. Send for catalogue. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

ELECTRICAL CONTRACTORS

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FOR SALE OIL PROPERTIES

CALIFORNIA OIL PROPERTIES

Containing 27 producing and two idle wells, two of which are in Huntington Beach, one in Rosecrans-Athens, and remainder in Long Beach-Signal Hill field. Gross daily production about 360 bbl., net owned about 280 bbl. daily. Oil not under contract. Recent engineering report and other data available for inspection at address given below.

Properties will be sold only as a unit. Sale will include all fixed lease equipment used in operation of wells. All oil produced and on hand at close of escrow will be excluded. Terms of sale cash upon confirmation; 10 per cent of amount offered to be deposited with bid. Bids to be in writing and will be received on or before Oct. 30, 1953, by

MILTON H. PHILLEO, Executor,
Estate of Louise E. Dabney,
620 W. Olympic Blvd., Los Angeles 15, California

ROYALTIES

WORLD'S LARGEST REGION for oil and gas condensate reserves and expectant oil fields, inquire for opportunities therein, A. S. Berry, P. O. Box 1383, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

SHALLOW DRILLING BLOCK: Interest checkerboarded on 9,300 acres in McCulloch County, Tex., to test the Cambrian Series through the Wilberns & Hickory. No Bonus, Override or Oil Payments. Quick action. J. E. Alexander, 1922-7st. Lubbock, Tex. pho. 34317; if no ans. call Brady, Tex. Brady Hotel pho. 2470; Lohn, Texas phone 19.

FOR SALE—MONTANA MINERAL RIGHTS—Cheap price range. Good return from lease rentals. Also CHEAP LEASES. All in active areas. N. R. Brasted, 816 Sinclair Bldg., FOrtune 3313, Fort Worth, Tex.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

160-ACRE LEASE available central Okla. for drilling, no way condemned, flowing well adjoining farm, 3 oil sands in area. Approx. 6600, 7200 and 7600 feet. Some wells reported more than 1000 barrels. If you are regularly engaged in the oil business and interested, write Land Owner, Box 572, Chickasha, Okla.

TWO LOTS north outskirts Snyder; two north outskirts Okla. City; one each Stanton, Lott, Quanah, Texas. Want drilling. W. A. Epps, Pioneer Hotel, Tucson, Arizona.

DRILLING DEAL: 90 acres, Chanute, Kansas, area. Sandfrack. Must drill immediately. Box 35, Iola, Kansas.

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

18 BARRELS DAILY production—shallow field, Eastern Kansas. Phone 4-1213 or write V. E. Sheffer, 500 Petroleum Bldg., Wichita, Kansas.

OWNER of approximately 10 acres in Welsh Oil Field, Jefferson Davis Parish near Lake Charles, La., wishes to lease ground to responsible individuals with view to early drilling operations. Box G-704, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

FINANCING

AN AGGRESSIVE, successful, Mid-Continent oil producer desires financing adequate to support additional exploration activities. This is a chance to do business with one of the most aggressive new companies in the field. Box G-689, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

LINES WANTED by manufacturers agent. Extensive contacts in the Oil Industries. Aggressive, experienced sales engineers traveling Mid-Continent area. Warehousing space available. Box G-707, The Oil and Gas Journal, Tulsa, Oklahoma.

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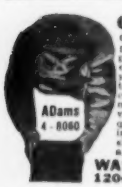

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WASHINGTON COMMERCIAL CO.
1200 18th St. N.W., Washington 9, D.C.

EQUIPMENT MEN

Koehring Co. Announces Two Sales Appointments

Two transfers in the sales departments of Koehring Co., Milwaukee, and one of its subsidiaries, Parsons Co., Newton, Iowa, have been announced by the parent firm. R. E. Bansemer, assistant sales manager at Koehring, has been named sales manager for Parsons, and M. O. Messenger, sales manager at the Iowa plant, has moved to Milwaukee to take over the assistant sales manager's duties in the parent company.

R. E. BANSEMER

M. O. MESSENGER

Bansemer joined Koehring in 1923 and has held posts in production, service, and sales. After some years as a district sales representative, he was named assistant sales manager in 1950.

Messenger began with Parsons in 1939 and progressed from the shop to purchasing, service, and sales to his last post.

L. W. Hanson Joins A. O. Smith Corp.

Lee W. Hanson, formerly with Shell Oil Co., has joined the Liquefied Gas Products Division of A. O. Smith Corp. as the sales representative covering South and Central Texas out of Houston. The appointment was announced by Frank W. Row, manager of the southern regional office of the division at Houston.

Hanson was with the L.P. gas-marketing division of Shell for the past 8 years.

Ramsey, Eddy, Bardsley Form Pipe-Line Service

Ramsey Eddy Manufacturing Co. has announced a new service to the pipe-line industry. Clyde Eddy, Rayburn Ramsey, and Bo Bardsley are the principals in the new company and have jointly formed REMCO.

Eddy was formerly chief engineer for Perrault Bros., and M. J. Crose Manufacturing Co. Ramsey, like Eddy, has long years of experience behind him in pipe-line manufacturing. Ramsey has manufactured winches and associated pipe-line equipment, and has specialized experience in the oil industry.

Sales manager for REMCO is Bo Bardsley. Before joining REMCO, Bardsley was Tulsa manager for Crutcher-Rolfs-Cummings. He has been been associated with the pipe-line industry for over 30 years.

Eddy states that REMCO offers a complete line of pipe-line equipment and supplies.

Continental Supply Adds Hutchison to Tubular Sales

Jerry Hutchison has joined the tubular sales division of The Continental Supply Co., it has been announced by J. A. Mussler, general manager of sales. He will specialize in Fibercast and plastic pipe sales.

Hutchison, who will work out of Continental's division headquarters in Tulsa, has been active in Fibercast pipe sales since 1947. He is an engineering graduate of Oklahoma A. & M.

Mud Engineers Watch Ohio Oil's Deep Well

Standing behind the shale shaker at Ohio Oil's world's record well at Paloma, Calif., are the men who supervised the mud program. They are, left to right: Al Seaman, Oil Base, Inc., engineer; "Curly" Doane, Ohio Oil drilling superintendent; and Charlie Piskac, Oil Base engineer. The Oil Base men were in daily attendance and supervised the maintenance of the mud (Black Magic) from the time it replaced the clay-water mud in the hole (at 10,995 ft.) to the world's record depth.

Lovejoy Named to Staff By Darwin H. Clark Co.

Dana C. Lovejoy, Jr., advertising man and sales analyst, has joined the staff of Darwin H. Clark Co., Los Angeles industrial advertising agency. Lovejoy served with the Baroid Sales Division of National Lead Co. in both Los Angeles and Houston for 5 years as assistant advertising manager, and for 1 year as head of the sales statistical analysis research department, which he organized.

The Clark agency is the exclusive Los Angeles member of Transamerica Advertising Agency Network, with associate offices in 18 leading cities from coast to coast.

Bethlehem Supply Opens Store at Whitesboro, Tex.

Bethlehem Supply Co. has announced the opening of its latest modern supply store at Whitesboro, Tex.

The new Whitesboro store is staffed with trained personnel and will maintain a well-rounded stock of drilling and production, refinery, and pipe-line materials.

The new store is under the supervision of W. E. Stephenson, district manager at Wichita Falls, Tex. C. W. Nichols, formerly field representative at the Odessa, Tex., store is the new store manager.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 1,815 acres of land in T. 29 N., Rs. 12 W. and 13 W., and T. 30 N., R. 6 W., N.M.P.M., within the known geologic structure of the San Juan field, New Mexico, will be offered in 7 parcels for oil and gas leasing through competitive bidding to the qualified bidders of the highest cash amounts per acre at 1 p.m., Eastern Standard time, October 14, 1953, when bids will be opened. Details of the lease offering, how and where to submit bids, and a description of the lands may be obtained upon request from the Manager of the Land and Survey Office, Santa Fe, New Mexico, or from the Bureau's Washington office. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that approximately 40 acres of land comprising NW¼NW¼ sec. 24, T. 37 N., R. 4 E., within the known geologic structure of the Whitlash field, Liberty County, Montana, will be offered in one parcel for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., E.S.T., October 21, 1953, when bids will be opened. Details of the lease offering and how and where to submit bids may be obtained upon request from the Manager of the Land Office, Billings, Montana, or from the Bureau's Washington Office. L. E. Hoffman, Chief, Division of Minerals.

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LEGAL

28,263.27 acres of Tribal Indian lands and 4,484.63 acres of Allotted Indian lands located on the Uintah and Ouray Indian Reservation, Townships 1 and 2 North, Ranges 1 East and 1 West, Uintah Special Base and Meridian Survey, Uintah and Duchesne Counties, State of Utah, are being advertised for oil and gas lease sale, bids on which will be opened 2:00 P. M., October 14, 1953, at the Uintah and Ouray Agency, Harry W. Gilmore, Superintendent, Fort Duchesne, Utah. Full particulars may be obtained from the office of the Regional Oil and Gas Supervisor, U. S. Geological Survey, Casper, Wyoming, or from the Uintah and Ouray Agency.

LEGAL

Sealed bids will be received at the office of the Area Director, Bureau of Indian Affairs, Room 395, Federal Building, Albuquerque, New Mexico, until 2:00 o'clock, P.M. (MST), October 15, 1953, and then publicly opened for sale of oil and gas leases on 26 tracts of Jicarilla Tribal Indian lands totaling 65,745 acres, more or less, located in the Rio Arriba and Sandoval Counties of New Mexico on the Jicarilla Indian Reservation. Each tract containing four sections each, is offered for lease separately. For complete description of the land, location, provisions and stipulations of the leases to be sold, address the Superintendent Jicarilla Indian Agency, Dulce, New Mexico.

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1 6' x 20' "YIWP" 15# National Treater

1 2C, 2½' x 13' 125# National Separator

1 NC, 2' x 6' 125# National Separator

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